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Marathon Oil

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Enforcement and Compliance
Assurance Division

November 1, 2019

Via Certified Mail: 7015 0640 0006 6407 4884

U. S. Environmental Protection Agency
Director, Air and Toxics Technical Enforcement Program
Office of Enforcement, Compliance, and Environmental Justice
Mail Code 8ENF-AT
1595 Wynkoop Street
Denver, Colorado 80202-1129

Dear Administrator:

In accordance with the requirements of Title 40 Code of Federal Regulations (CFR) Subpart OOOOa, Standards of Performance for Crude Oil and Natural Gas Facilities for which construction, modification, or reconstruction commenced after September 18, 2015, Marathon Oil Company (Marathon) hereby submits its annual report for the August 2, 2017 through August 1, 2018 reporting period as required by 40 CFR 5420a(b)(1). The report information is listed by regulatory citation as noted below:

40 CFR 5420a(b)(1)(i) The company name, facility site name associated with the affected facility, US Well ID or US Well ID associated with the affected facility, if applicable, and address of the affected facility. If an address is not available for the site, include a description of the site location and provide the latitude and longitude coordinates of the site in decimal degrees to an accuracy and precision of five (5) decimals of a degree using the North American Datum of 1983.

The company name is Marathon Oil Company, and the facility site name, well API number, and coordinates of each site are included in **Appendix A**.

40 CFR 5420a(b)(1)(ii) An identification of each affected facility being included in the annual report.

Appendix B contains a list of affected facilities by facility site name.

40 CFR 5420a(b)(1)(iii) Beginning and ending dates of the reporting period.

The reporting period is August 2, 2018 through August 1, 2019.

40 CFR 5420a(b)(1)(iv) **A certification by a certifying official of truth, accuracy, and completeness. This certification shall state that, based on information and belief formed after reasonable inquiry, the statements and information in the document are true, accurate, and complete.**

I certify based on information and belief formed after reasonable inquiry, that the statements and information in this document are true, accurate, and complete.

40 CFR 5420a(b)(2)(i) **For each well affected facility, records of each well completion operation as specified in paragraphs (c)(1)(i) through (iv) and (vi) of §60.5420a, if applicable, for each well affected facility conducted during the reporting period. In lieu of submitting the records specified in paragraph (c)(1)(i) through (iv) of §60.5420a, the owner or operator may submit a list of the well completions with hydraulic fracturing completed during the reporting period and the records required by paragraph (c)(1)(v) of §60.5420a for each well completion.**

1) **Records identifying each well completion operation for each well affected facility;**
   a) **Records of deviations in cases where well completion operations with hydraulic fracturing were not performed in compliance with the requirements specified in §60.5375a.**
   b) **Records required in §60.5375a(b) or (f)(3) for each well completion operation conducted for each well affected facility that occurred during the reporting period. You must maintain the records specified in paragraphs (c)(1)(iii)(A) through (C) of this section.**
      i) **(A) For each well affected facility required to comply with the requirements of §60.5375a(a), you must record: The location of the well; the United States Well Number; the date and time of the onset of flowback following hydraulic fracturing or re-fracturing; the date and time of each attempt to direct flowback to a separator as required in §60.5375a(a)(1)(ii); the date and time of each occurrence of returning to the initial flowback stage under §60.5375a(a)(1)(i); and the date and time that the well was shut in and the flowback equipment was permanently disconnected, or the startup of production; the duration of flowback; duration of recovery and disposition of recovery (*i.e.,* routed to the gas flow line or collection system, re-injected into the well or another well, used as an onsite fuel source, or used for another useful purpose that a purchased fuel or raw material would serve); duration of combustion; duration of venting; and specific reasons for venting in lieu of capture or combustion. The duration must be specified in hours. In addition, for wells where it is technically infeasible to route the recovered gas to any of the four options specified in §60.5375a(a)(1)(ii), you must record the reasons for the claim of technical infeasibility with respect to all four options provided in that subparagraph, including but not limited to; name and location of the nearest gathering line and technical considerations preventing routing to this line; capture, reinjection, and reuse technologies considered and aspects of gas or equipment preventing use of recovered gas as a fuel onsite; and technical considerations preventing use of recovered gas for other useful purpose that that a purchased fuel or raw material would serve.**

c) For each well affected facility required to comply with the requirements of §60.5375a(f), you must maintain the records specified in paragraph (c)(1)(iii)(A) of §60.5420a except that you do not have to record the duration of recovery to the flow line.
d) For each well affected facility for which you make a claim that it meets the criteria of §60.5375a(a)(1)(iii)(A), you must maintain the following:
   i) Records specified in paragraph (c)(1)(iii)(A) of this section except that you do not have to record: The date and time of each attempt to direct flowback to a separator; the date and time of each occurrence of returning to the initial flowback stage; duration of recovery and disposition of recovery (*i.e.* routed to the gas flow line or collection system, re-injected into the well or another well, used as an onsite fuel source, or used for another useful purpose that a purchased fuel or raw material would serve.
   ii) If applicable, records that the conditions of §60.5375a(1)(iii)(A) are no longer met and that the well completion operation has been stopped and a separator installed. The records shall include the date and time the well completion operation was stopped and the date and time the separator was installed.
   iii) A record of the claim signed by the certifying official that no liquids collection is at the well site. The claim must include a certification by a certifying official of truth, accuracy and completeness. This certification shall state that, based on information and belief formed after reasonable inquiry, the statements and information in the document are true, accurate, and complete.
   iv) For each well affected facility for which you claim an exception under §60.5375a(a)(3), you must record: The location of the well; the United States Well Number; the specific exception claimed; the starting date and ending date for the period the well operated under the exception; and an explanation of why the well meets the claimed exception.

Well completions with hydraulic fracturing which occurred during the reporting period are included in **Appendix C**. Marathon does not claim any exceptions under §60.5375a(a)(3).

40 CFR 5420a(b)(2)(ii) For each well affected facility, records of deviations specified in paragraph (c)(1)(ii) of §60.5420a that occurred during the reporting period.

Marathon claims technical infeasibility under §60.5375a(a)(3) with respect to routing the recovered gas as specified in §60.5375a(a)(1)(ii) for the wells listed in Appendix C that had flaring. However, the current records reflecting the underlying detail are incomplete and thus Marathon is unable to report the specific details.

Furthermore, additional records of deviations where well completion operations with hydraulic fracturing were not performed in compliance with the requirements specified in §60.5375a (§60.5420a (b) (2) (ii) and §60.5420a(c) (1) (ii)) are identified in **Appendix C** by facility site name.

__40 CFR 5420a(b)(2)(iii)__ **For each well affected facility, records specified in paragraph (c)(1)(vii) of §60.5420a, if applicable, that support a determination under 60.5432a that the well affected facility is a low pressure well as defined in 60.5430a.**

There were no low pressure well completion operations which occurred during the reporting period.

__40 CFR 5420a(b)(3)(i)__ **For each centrifugal compressor affected facility, an identification of each centrifugal compressor using a wet seal system constructed, modified or reconstructed during the reporting period.**

There were no centrifugal compressor affected facilities using a wet seal system constructed, modified, or reconstructed by Marathon during the reporting period.

__40 CFR 5420a(b)(3)(ii)__ **For each centrifugal compressor affected facility, records of deviations specified in paragraph (c)(2) of §60.5420a that occurred during the reporting period.**

There were no deviations associated with centrifugal compressor affected facilities during the reporting period.

__40 CFR 5420a(b)(3)(iii)__ **For each centrifugal compressor affected facility, if required to comply with §60.5380a(a)(2), the records specified in paragraphs (c)(6) through (11) of §60.5420a.**

Marathon did not operate, construct, modify, or reconstruct any centrifugal compressor affected facility during the reporting period. Therefore there are no records as specified in paragraphs (c) (6) through (11) of §60.5420a.

__40 CFR 5420a(b)(3)(iv)__ **If complying with §60.5380a(a)(1) with a control device tested under §60.5413a(d) which meets the criteria in §60.5413a(d)(11) and §60.5413a(e), records specified in paragraph (c)(2)(i) through (c)(2)(vii) of §60.5420a for each centrifugal compressor using a wet seal system constructed, modified or reconstructed during the reporting period.**

Marathon did not operate any centrifugal compressors with wet seal systems during the reporting period.

__40 CFR 5420a(b)(4)(i)__ **For each reciprocating compressor affected facility, the cumulative number of hours of operation or the number of months since initial startup or since the previous reciprocating compressor rod packing replacement, whichever is later. Alternatively, a statement that emissions from the rod packing are being routed to a process through a closed vent system under negative pressure.**

Marathon did not operate construct, modify, or reconstruct any reciprocating compressor affected facilities during the reporting period.

<u>40 CFR 5420a(b)(4)(ii)</u> For each reciprocating compressor affected facility, records of deviations specified in paragraph (c)(3)(iii) of §60.5420a that occurred during the reporting period.

Marathon did not construct, modify, or reconstruct any reciprocating compressor affected facilities during the reporting period.

<u>40 CFR 5420a(b)(5)(i)</u> For each pneumatic controller affected facility, an identification of each pneumatic controller constructed, modified or reconstructed during the reporting period, including the identification information specified in §60.5390a(b)(2) or (c)(2).

Marathon did not construct, modify, or reconstruct any pneumatic controller affected facilities during the reporting period

<u>40 CFR 5420a(b)(5)(ii)</u> For each pneumatic controller affected facility, if applicable, documentation that the use of pneumatic controller affected facilities with a natural gas bleed rate greater than 6 standard cubic feet per hour are required and the reasons why.

Marathon did not construct, modify, or reconstruct any pneumatic controller affected facilities during the reporting period.

<u>40 CFR 5420a(b)(5)(iii)</u> For each pneumatic controller affected facility, records of deviations specified in paragraph (c)(4)(v) of §60.5420a that occurred during the reporting period.

Marathon did not construct, modify, or reconstruct any pneumatic controller affected facilities during the reporting period.

<u>40 CFR 5420a(b)(6)(i)</u> For each storage vessel affected facility, an identification, including the location, of each storage vessel affected facility for which construction, modification or reconstruction commenced during the reporting period. The location of the storage vessel shall be in latitude and longitude coordinates in decimal degrees to an accuracy and precision of five (5) decimals of a degree using the North American Datum of 1983.

Appendix D contains a list of storage vessel affected facilities.

<u>40 CFR 5420a(b)(6)(ii)</u> For each storage vessel affected facility, documentation of the VOC emission rate determination according to §60.5365a(e) for each storage vessel that became an affected facility during the reporting period or is returned to service during the reporting period.

Storage vessel affected facility VOC emission rate determinations are included in **Appendix E**.

<u>40 CFR 5420a(b)(6)(iii)</u> For each storage vessel affected facility, records of deviations specified in paragraph (c)(5)(iii) of §60.5420a that occurred during the reporting period.

Deviations associated with storage tank requirements are identified in **Appendix F** by facility site name.

40 CFR 5420a(b)(6)(iv) For each storage vessel affected facility, a statement that you have met the requirements specified in §60.5410a(h)(2) and (3).

VOC emission rates were reduced in accordance with the requirements of §60.5365a(e)(1) through (e)(4) including the cover requirements specified in §60.5411a(b) and the closed vent system requirements specified in §60.5411a(c). A control device was used to reduce emissions, and initial compliance was determined by meeting the requirements in §60.5395a(e), including the control device requirements in §60.5412a(d)(3). The control device requirements in §60.5412a(c) did not apply since Marathon does not operate any carbon absorption systems.

40 CFR 5420a(b)(6)(v) For each storage vessel affected facility, you must identify each storage vessel affected facility that is removed from service during the reporting period as specified in §60.5395a(c)(1)(ii), including the date the storage vessel affected facility was removed from service.

No storage vessel affected facilities were removed from service during the reporting period.

40 CFR 5420a(b)(6)(vi) You must identify each storage vessel affected facility returned to service during the reporting period as specified in §60.5395a(c)(3), including the date the storage vessel affected facility was returned to service.

No storage vessel affected facility was returned to service during the reporting period.

40 CFR 5420a(b)(6)(vii) For each storage vessel affected facility, if complying with §60.5395a(a)(2) with a control device tested under §60.5413a(d) which meets the criteria in §60.5413a(d)(11) and §60.5413a(e), records specified in paragraphs (c)(5)(vi)(A) through (F) of §60.5420a for each storage vessel constructed, modified, reconstructed or returned to service during the reporting period.

Marathon did not operate any combustion control devices with a manufacturer's performance test during the reporting period.

40 CFR 5420a(b)(7) For the collection of fugitive emissions components at each well site and the collection of fugitive emissions components at each compressor station within the company-defined area, the records of each monitoring survey including the information specified in paragraphs (b)(7)(i) through (xii) of §60.5420a . For the collection of fugitive emissions components at a compressor station, if a monitoring survey is waived under §60.5397a(g)(5), you must include in your annual report the fact that a monitoring survey was waived and the calendar months that make up the quarterly monitoring period for which the monitoring survey was waived.

1) **Date of the survey.**
2) **Beginning and end time of the survey.**
3) **Name of operator(s) performing survey. If the survey is performed by optical gas imaging, you must note the training and experience of the operator.**
4) **Ambient temperature, sky conditions, and maximum wind speed at the time of the survey.**

5) Monitoring instrument used.
6) Any deviations from the monitoring plan or a statement that there were no deviations from the monitoring plan.
7) Number and type of components for which fugitive emissions were detected.
8) Number and type of fugitive emissions components that were not repaired as required in §60.5397a(h).
9) Number and type of difficult-to-monitor and unsafe-to-monitor fugitive emission components monitored.
10) The date of successful repair of the fugitive emissions component.
11) Number and type of fugitive emission components placed on delay of repair and explanation for each delay of repair.
12) Type of instrument used to resurvey a repaired fugitive emissions component that could not be repaired during the initial fugitive emissions finding.

The required records are located in **Appendix G**.

<u>40 CFR 5420a(b)(8)(i)</u> For each pneumatic pump that is constructed, modified or reconstructed during the reporting period, you must provide certification that the pneumatic pump meets one of the conditions described in paragraphs (b)(8)(i)(A), (B) or (C) of this section.

1) **No control device or process is available on site.**
2) **A control device or process is available on site and the owner or operator has determined in accordance with §60.5393a(b)(5) that it is technically infeasible to capture and route the emissions to the control device or process.**
3) **Emissions from the pneumatic pump are routed to a control device or process. If the control device is designed to achieve less than 95 percent emissions reduction, specify the percent emissions reductions the control device is designed to achieve.**

No pneumatic pumps were constructed, modified, or reconstructed at the facilities listed in **Appendix A** during the reporting period.

<u>40 CFR 5420a(b)(8)(ii)</u> For any pneumatic pump affected facility which has been previously reported as required under paragraph (b)(8)(i) of §60.5420a and for which a change in the reported condition has occurred during the reporting period, provide the identification of the pneumatic pump affected facility and the date it was previously reported and a certification that the pneumatic pump meets one of the conditions described in paragraphs (b)(8)(ii)(A), (B) or (C) or (D) of this section.

1) **A control device has been added to the location and the pneumatic pump now reports according to paragraph (b)(8)(i)(C) of this section.**
2) **A control device has been added to the location and the pneumatic pump affected facility now reports according to paragraph (b)(8)(i)(B) of this section.**
3) **A control device or process has been removed from the location or otherwise is no longer available and the pneumatic pump affected facility now report according to paragraph (b)(8)(i)(A) of this section.**
4) **A control device or process has been removed from the location or is otherwise no longer available and the owner or operator has determined in accordance with §60.5393a(b)(5)**

through an engineering evaluation that it is technically infeasible to capture and route the emissions to another control device or process.

No pneumatic pumps were constructed, modified, or reconstructed at the facilities listed in **Appendix A** during the reporting period.

40 CFR 5420a(b)(8)(iii) For any pneumatic pump affected facility, records of deviations specified in paragraph (c)(16)(ii) of §5420a that occurred during the reporting period.

No pneumatic pumps were constructed during the reporting period.

40 CFR 5420a(b)(9) Within 60 days after the date of completing each performance test (see §60.8) required by 40 CFR 60.5420a, except testing conducted by the manufacturer as specified in §60.5413a(d), you must submit the results of the performance test following the procedure specified in either paragraph (b)(9)(i) or (ii) of §60.5420a.

1) **For data collected using test methods supported by the EPA's Electronic Reporting Tool (ERT) as listed on the EPA's ERT Web site (*https://www3.epa.gov/ttn/chief/ert/ert_info.html*) at the time of the test, you must submit the results of the performance test to the EPA via the Compliance and Emissions Data Reporting Interface (CEDRI). (CEDRI can be accessed through the EPA's Central Data Exchange (CDX) (*https://cdx.epa.gov/*).) Performance test data must be submitted in a file format generated through the use of the EPA's ERT or an alternate electronic file format consistent with the extensible markup language (XML) schema listed on the EPA's ERT Web site. If you claim that some of the performance test information being submitted is confidential business information (CBI), you must submit a complete file generated through the use of the EPA's ERT or an alternate electronic file consistent with the XML schema listed on the EPA's ERT Web site, including information claimed to be CBI, on a compact disc, flash drive, or other commonly used electronic storage media to the EPA. The electronic media must be clearly marked as CBI and mailed to U.S. EPA/OAQPS/CORE CBI Office, Attention: Group Leader, Measurement Policy Group, MD C404-02, 4930 Old Page Rd., Durham, NC 27703. The same ERT or alternate file with the CBI omitted must be submitted to the EPA via the EPA's CDX as described earlier in this paragraph.**
2) **For data collected using test methods that are not supported by the EPA's ERT as listed on the EPA's ERT Web site at the time of the test, you must submit the results of the performance test to the Administrator at the appropriate address listed in §60.4.**

No performance tests were conducted by Marathon during the reporting period.

40 CFR 5420a(b)(10) For combustion control devices tested by the manufacturer in accordance with §60.5413a(d), an electronic copy of the performance test results required by §60.5413a(d) shall be submitted via email to *Oil_and_Gas_PT@EPA.GOV* unless the test results for that model of combustion control device are posted at the following Web site: *epa.gov/airquality/oilandgas/*.

No combustion control devices were installed by Marathon during the reporting period.

40 CFR 5420a(b)(11) You must submit reports to the EPA via the CEDRI. (CEDRI can be accessed through the EPA's CDX (*https://cdx.epa.gov/*).) You must use the appropriate electronic report in CEDRI for this subpart or an alternate electronic file format consistent with the extensible markup language (XML) schema listed on the CEDRI Web site (*https://www3.epa.gov/ttn/chief/cedri/*). If the reporting form specific to this subpart is not available in CEDRI at the time that the report is due, you must submit the report to the Administrator at the appropriate address listed in §60.4. Once the form has been available in CEDRI for at least 90 calendar days, you must begin submitting all subsequent reports via CEDRI. The reports must be submitted by the deadlines specified in this subpart, regardless of the method in which the reports are submitted.

No reports were submitted to the EPA via the CEDRI by Marathon during the reporting period.

40 CFR 5420a(b)(12) You must submit the certification signed by the qualified professional engineer according to §60.5411a(d) for each closed vent system routing to a control device or process.

The certifications signed by a qualified professional engineer according to §60.5411a(d) were included in Appendix H for the wells included in Appendix A.

Please do not hesitate to contact me if you require additional information concerning this report.

Sincerely,

(b) (6) [redacted]

Lee Ann Reiter

Appendix A -- List of Affected Facilities Site

Appendix A -- List of Affected Facilities Sites			
Well/Facility Name	**API Number**	**Latitude**	**Longitude**
Anton 34-33TFH	33-061-03525	(b) (9) [redacted]	(b) (9) [redacted]
Appledoorn 14-19H	33-025-00692	[redacted]	[redacted]
Arden USA 14-9TFH	33-053-07508	[redacted]	[redacted]
Arkin 44-12TFH	33-025-03294	[redacted]	[redacted]
Arthur 24-35H	33-025-03341	[redacted]	[redacted]
Atkinson USA 31-17TFH	33-061-04224	[redacted]	[redacted]
Axell USA 34-19TFH	33-061-04119	[redacted]	[redacted]
Ballmeyer USA 41-17TFH	33-061-03841	[redacted]	[redacted]
Bear Den 42-5TFH	33-025-01773	[redacted]	[redacted]
Bears Arm USA 41-2H	33-061-04061	[redacted]	[redacted]
Beck 14-8H	33-025-00649	[redacted]	[redacted]
Beck 24-8H	33-025-00636	[redacted]	[redacted]
Becky USA 21-17tFH	33-061-03838	[redacted]	[redacted]
Begola USA 34-22H	33-053-07706	[redacted]	[redacted]
Berry USA 21-18H	33-061-04163	[redacted]	[redacted]
Bethol 34-7H	33-025-03269	[redacted]	[redacted]
Big Head USA 41-2TFH	33-061-04026	[redacted]	[redacted]
Bill Connolly 21-25H	33-025-00650	[redacted]	[redacted]
Bingo 24-10TFH	33-061-03580	[redacted]	[redacted]
Birds Bill USA 41-2TFH	33-061-04027	[redacted]	[redacted]
Blanche 14-36H	33-025-03756	[redacted]	[redacted]
BLUE CREEK 24-22TFH-2B	33-053-06518	[redacted]	[redacted]
Bobby Lee USA 41-30H	33-053-04673	[redacted]	[redacted]
Brant USA 44-34TFH	33-061-03966	[redacted]	[redacted]
Briek USA 13-14H	33-053-08224	[redacted]	[redacted]
Bronett 14-7H	33-025-03293	[redacted]	[redacted]
Bruhn USA 21-17H	33-061-04223	[redacted]	[redacted]
Brush 24-8H	33-025-02832	[redacted]	[redacted]
Burshia USA 14-7H	33-061-04171	[redacted]	[redacted]
Cantrill USA 11-29TFH	33-053-08136	[redacted]	[redacted]
Catherine 44-35H	33-025-03559	[redacted]	[redacted]
Chapman 31-15H	33-025-03263	[redacted]	[redacted]
Charchenko 14-21H	33-025-00797	[redacted]	[redacted]
Charles Shobe USA 44-19H	33-061-00849	[redacted]	[redacted]
Charlie 24-10H	33-061-03582	[redacted]	[redacted]
Charmaine USA 14-35TFH	33-053-06864	[redacted]	[redacted]
Chauncey USA 31-2H	33-053-07956	[redacted]	[redacted]
Chimney Butte 34-11H	33-025-00804	[redacted]	[redacted]
Christensen 34-33H	33-025-00699	[redacted]	[redacted]

Appendix A -- List of Affected Facilities Sites			
Well/Facility Name	**API Number**	**Latitude**	**Longitude**
Clara USA 11-23TFH-2B	33-053-08160	(b) (9) [redacted]	(b) (9) [redacted]
Clarice USA 14-9H	33-025-02687		
Clarks Creek USA 14-35H	33-053-06865		
Coburn USA 41-30TFH	33-053-04672		
Connie Connolly 21-26H	33-025-00806		
Crosby USA 41-6H	33-025-03005		
Cunningham USA 31-4H	33-053-07475		
Darcy 34-32H	33-025-00642		
Darvey Klatt 44-22H	33-025-00921		
Deane USA 24-22H	33-053-06522		
Dearborn USA 24-7TFH	33-061-04172		
Debbie Baklenko USA 12-26H	33-053-03330		
Delia USA 14-9TFH	33-025-026880		
Demaray USA 41-2TFH	33-053-07693		
Deserly USA 11-1TFH	33-061-04063		
Double H 34-8TFH	33-025-02691		
Drake 44-16H	33-025-03455		
Driftwood USA 41-17H	33-061-04264		
Dutton USA 21-1TFH	33-061-04064		
Dye USA 14-14TFH-2B	33-053-08226		
Eagle USA 41-5H	33-025-01867		
Ernst 14-7TFH	33-025-03267		
Eunice USA 11-16TFH	33-061-04263		
Fannie USA 21-1H	33-061-04065		
Flynn USA 21-16TFH	33-061-04262		
Forsman USA 44-22H	33-053-07703		
Four Dances USA 41-25TFH	33-053-08049		
Fred Hansen 34-8H	33-025-00749		
French 31-15TFH	33-025-03262		
Galen Fox USA 24-7H	33-061-01388		
Garness USA 31-4TFH-2B	33-053-07474		
Gartland USA 31-16H	33-061-04259		
Gaynor 34-33H	33-061-03524		
Gifford 34-11TFH	33-025-03280		
Gloria 24-16H	33-025-03500		
Goldberg USA 24-33TFH	33-061-03523		
Goodall USA 11-29H	33-053-03192		
Grady USA 21-4H	33-053-07472		
Grant USA 21-18TFH	33-061-04162		

Appendix A -- List of Affected Facilities Sites			
Well/Facility Name	**API Number**	**Latitude**	**Longitude**
Gravel Coulee 14-11TFH	33-025-03311	(b) (9) [redacted]	(b) (9) [redacted]
Gretchen USA 11-30H	33-053-08050	[redacted]	[redacted]
Greybull USA 31-18TFH	33-061-04164	[redacted]	[redacted]
Gudmon 44-35TFH	33-025-03357	[redacted]	[redacted]
Gwen 44-36TFH	33-025-03584	[redacted]	[redacted]
Hal USA 34-34H	33-061-03836	[redacted]	[redacted]
Hammerberg USA 14-14H	33-053-08227	[redacted]	[redacted]
Hannah USA 31-4TFH	33-061-03528	[redacted]	[redacted]
Hans USA 31-17TFH	33-061-03839	[redacted]	[redacted]
Harley 14-36TFH	33-061-04002	[redacted]	[redacted]
Hartvig 14-8TFH	33-025-03443	[redacted]	[redacted]
Hayes 14-31H	33-025-03583	[redacted]	[redacted]
Heather USA 13-35TFH	33-053-06867	[redacted]	[redacted]
Higgins 31-26TFH	33-025-03463	[redacted]	[redacted]
Hillesland 31-3TFH	33-025-02792	[redacted]	[redacted]
Hollingsworth 24-22TFH	33-025-02516	[redacted]	[redacted]
Homme 11-18TFH	33-061-04007	[redacted]	[redacted]
Honaker USA 41-30TFH	33-053-08138	[redacted]	[redacted]
Hondo 34-12TFH	33-025-03257	[redacted]	[redacted]
Houser 14-36H	33-061-04003	[redacted]	[redacted]
Howard USA 11-1H	33-061-01196	[redacted]	[redacted]
Hugo 34-11H	33-025-03279	[redacted]	[redacted]
Hunts Along USA 12-1H	33-053-03083	[redacted]	[redacted]
Hurkes USA 41-16TFH	33-061-04227	[redacted]	[redacted]
Irish USA 41-25TFH	33-053-08047	[redacted]	[redacted]
Iron Woman USA 14-9H	33-053-07921	[redacted]	[redacted]
Jackie USA 34-34TFH	33-061-03835	[redacted]	[redacted]
Jerome USA 12-23TFH	33-053-07754	[redacted]	[redacted]
JL Shobe 24-10TFH	33-061-03581	[redacted]	[redacted]
Joanne Quale USA 21-30H	33-053-03948	[redacted]	[redacted]
Jocelyn 14-36TFH	33-025-03468	[redacted]	[redacted]
Jones USA 14-14H	33-053-03258	[redacted]	[redacted]
Joshua USA 13-23TFH-2B	33-053-07752	[redacted]	[redacted]
Juanita USA 13-35H	33-053-06868	[redacted]	[redacted]
Julia Jones USA 13-14TFH	33-053-08225	[redacted]	[redacted]
June USA 31-2H	33-053-07958	[redacted]	[redacted]
Kattevold USA 14-34TFH	33-061-04052	[redacted]	[redacted]
Kemp Trust 21-14H	33-025-00870	[redacted]	[redacted]
Kenneth 24-7TFH	33-025-03268	[redacted]	[redacted]

Appendix A -- List of Affected Facilities Sites			
Well/Facility Name	**API Number**	**Latitude**	**Longitude**
Kermit USA 14-9H	33-053-07507	(b) (9) [redacted]	(b) (9) [redacted]
Kinney 24-36TFH	33-025-03469	[redacted]	[redacted]
Klaus 11-28H	33-025-03422	[redacted]	[redacted]
Kukla 34-34H	33-025-00606	[redacted]	[redacted]
Lacey USA 11-5H	33-061-03754	[redacted]	[redacted]
Ladonna Klatt 24-22H	33-025-00733	[redacted]	[redacted]
Lamarr USA 13-23TFH	33-053-07751	[redacted]	[redacted]
Larry Repp 31-16H	33-025-00720	[redacted]	[redacted]
Lars 14-8H	33-025-03446	[redacted]	[redacted]
Lawrence 34-35H	33-025-03343	[redacted]	[redacted]
Lena USA 14-22H	33-053-07922	[redacted]	[redacted]
Linton USA 31-16TFH	33-061-04226	[redacted]	[redacted]
Lockwood USA 44-22TFH	33-053-07704	[redacted]	[redacted]
Loftquist USA 34-34TFH	33-061-03965	[redacted]	[redacted]
Lois USA 14-34H	33-061-04055	[redacted]	[redacted]
Loren USA 14-23TFH	33-053-07749	[redacted]	[redacted]
Lucas 34-35TFH	33-025-03359	[redacted]	[redacted]
Lund 44-35H	33-061-04001	[redacted]	[redacted]
Maggie USA 21-4H	33-061-03527	[redacted]	[redacted]
Maleckar USA 31-30H	33-053-08133	[redacted]	[redacted]
Mamie USA 21-11TFH	33-053-07989	[redacted]	[redacted]
Marcella USA 21-4TFH	33-053-07473	[redacted]	[redacted]
Marjorie 14-10H	33-061-03579	[redacted]	[redacted]
Mark USA 11-1H	33-053-07990	[redacted]	[redacted]
Marlene 34-11TFH	33-025-03282	[redacted]	[redacted]
Marlin 24-12H	33-025-00579	[redacted]	[redacted]
Martha Grube USA 14-20H	33-061-04016	[redacted]	[redacted]
Martinez USA 24-8H	33-025-03025	[redacted]	[redacted]
Mary Hansen 14-9H	33-025-00693	[redacted]	[redacted]
Mason 14-31TFH	33-025-03582	[redacted]	[redacted]
Mattie 14-22TFH	33-025-02515	[redacted]	[redacted]
McCrory 44-35TFH	33-025-03560	[redacted]	[redacted]
McDonald USA 44-19H	33-061-04121	[redacted]	[redacted]
McFadden 14-11H	33-025-03304	[redacted]	[redacted]
McKinley USA 24-7TFH	33-061-04173	[redacted]	[redacted]
McMahon USA 14-34H	33-061-03832	[redacted]	[redacted]
Meredith 14-24H	33-025-03727	[redacted]	[redacted]
Michelle USA 14-14TFH	33-053-08158	[redacted]	[redacted]
Mikkelsen 11-14H	33-061-03585	[redacted]	[redacted]

Appendix A -- List of Affected Facilities Sites			
Well/Facility Name	**API Number**	**Latitude**	**Longitude**
Miles 41-2TFH-2B	33-053-07959	(b) (9) [redacted]	(b) (9) [redacted]
Miriam USA 11-17H	33-061-04221	[redacted]	[redacted]
Mittelstadt 34-12H	33-025-03256	[redacted]	[redacted]
Moline 14-32H	33-061-03755	[redacted]	[redacted]
Monteau USA 34-7H	33-061-04174	[redacted]	[redacted]
Morrison 24-11H	33-025-03306	[redacted]	[redacted]
Murphy 34-22TFH-2B	33-053-07705	[redacted]	[redacted]
Ness USA 31-17H	33-061-03837	[redacted]	[redacted]
Nora Jones USA 12-14TFH-2B	33-053-08223	[redacted]	[redacted]
Northrop 34-16H	33-025-03453	[redacted]	[redacted]
Nugget USA 14-20TFH	33-061-04017	[redacted]	[redacted]
Olea 24-11TFH	33-025-03305	[redacted]	[redacted]
Oneil 24-24H	33-025-00770	[redacted]	[redacted]
Oneil 34-24H	33-025-00830	[redacted]	[redacted]
Oren USA 31-6TFH	33-061-01624	[redacted]	[redacted]
Oscar Stohler 41-4H	33-025-00610	[redacted]	[redacted]
Otis 11-28TFH	33-025-03423	[redacted]	[redacted]
Pelton 24-31H	33-025-00760	[redacted]	[redacted]
Pfundheller USA 44-33H	33-061-04051	[redacted]	[redacted]
Phyllis USA 11-23H	33-053-08159	[redacted]	[redacted]
Quill 34-11H	33-025-00810	[redacted]	[redacted]
Rafter X 44-35H	33-025-03356	[redacted]	[redacted]
Ranger USA 24-34TFH	33-061-03833	[redacted]	[redacted]
Raymond USA 41-4H	33-061-01068	[redacted]	[redacted]
Red Feather USA 21-17H	33-061-01613	[redacted]	[redacted]
Red Feather USA 31-17H	33-061-01612	[redacted]	[redacted]
Reno USA 24-9TFH-2B	33-053-07506	[redacted]	[redacted]
Repp 34-34H	33-025-00655	[redacted]	[redacted]
Reyes USA 21-16H	33-061-04261	[redacted]	[redacted]
Ringer 14-21TFH	33-025-02659	[redacted]	[redacted]
Rita 41-3TFH	33-025-03310	[redacted]	[redacted]
Rochelle USA 21-17TFH	33-061-04222	[redacted]	[redacted]
Ronald 34-33TFH-2B	33-061-03804	[redacted]	[redacted]
Ross 42-5H	33-025-01774	[redacted]	[redacted]
Rough Coulee USA 24-22TFH	33-053-06521	[redacted]	[redacted]
Rue USA 44-19TFH	33-061-04120	[redacted]	[redacted]
Rufus USA 21-4TFH	33-061-03526	[redacted]	[redacted]
Rummel 24-35TFH	33-025-03342	[redacted]	[redacted]
Ruth 44-23TFH	33-025-03465	[redacted]	[redacted]

Appendix A -- List of Affected Facilities Sites			
Well/Facility Name	**API Number**	**Latitude**	**Longitude**
Ryan 42-5TFH	33-025-03123	(b) (9) [redacted]	(b) (9) [redacted]
Sears USA 21-16TFH	33-061-04260		
Sheldon USA 21-30TFH	33-053-08414		
Shoots USA 41-2H	33-053-07988		
Shrader 41-13H	33-061-04004		
Sibyl USA 44-19TFH	33-061-04122		
Skadeland USA 31-30TFH	33-053-08134		
Snider 41-26TFH	33-025-03464		
Snowman USA 41-25H	33-053-08048		
Spring 21-15TFH	33-025-03264		
Stanton 41-3H	33-025-03309		
Stark 44-35TFH	33-061-03725		
State Eggert 24-36H	33-025-03537		
State Eileen 34-36TFH	33-025-03538		
State Elias 34-36TFH	33-025-03539		
State Etta 44-36H	33-025-03540		
State Kelling 14-36TFH	33-025-03360		
State Kreiger 14-36H	33-025-03361		
State Oster 14-36TFH	33-025-03362		
Stroup 34-7TFH	33-025-03270		
Struthers USA 41-5H	33-025-03124		
Sundby 24-11TFH	33-025-03307		
TAT USA 12-23H	33-053-03677		
TAT USA 14-22H	33-053-06658		
TAT USA 34-22H	33-053-03182		
Tescher 11-27H	33-025-01071		
Timothy USA 11-1TFH-2B	33-053-07991		
Tipton 34-11H	33-025-03281		
Tony USA 24-34H	33-061-03834		
Torrison 24-8TFH	33-025-02831		
Trinity 14-21H	33-025-02658		
Trotter 14-23H	33-025-00684		
Turkey Feet USA 41-17TFH	33-061-04225		
Two Bar 34-35H	33-025-03358		
Ulmer 24-21H	33-025-02661		
Veddy 44-16H	33-025-03454		
Veronica 14-22TFH	33-053-06520		
Voigt 11-15H	33-025-00700		
Walking Eagle USA 44-12TFH	33-061-04151		

Appendix A -- List of Affected Facilities Sites			
Well/Facility Name	**API Number**	**Latitude**	**Longitude**
Weidman USA 11-15TFH	33-061-04229	(b) (9) [redacted]	(b) (9) [redacted]
Wendell USA 31-30H	33-053-08135	[redacted]	[redacted]
Weninger USA 44-34H	33-061-01374	[redacted]	[redacted]
White Owl USA 41-16H	33-061-04228	[redacted]	[redacted]
Whitebody USA 14-23H	33-053-07750	[redacted]	[redacted]
Wickett 24-35TFH	33-025-03340	[redacted]	[redacted]
Wilbur USA 31-2TFH	33-053-07957	[redacted]	[redacted]
Wilhelm 24-21TFH	33-025-02660	[redacted]	[redacted]
Wilkinson USA 11-1H	33-061-04062	[redacted]	[redacted]
Winona USA 21-2TFH-2B	33-053-07955	[redacted]	[redacted]
WM & Agnes Scott 14-25H	33-025-00818	[redacted]	[redacted]
Yellow Otter USA 14-7TFH	33-061-04153	[redacted]	[redacted]
Yellowface USA 13-23H	33-053-08368	[redacted]	[redacted]
Young Woman USA 44-12H	33-061-04152	[redacted]	[redacted]
Zelda USA 11-29H	33-053-08137	[redacted]	[redacted]

Appendix B – Affected Facility Informa

Appendix B – Affected Facility Information								
Well Name	**Facility Name**	**Well**	**Centrifugal Compressor**	**Reciprocating Compressor**	**Pneumatic Controller**	**Pneumatic Pump**	**Storage Vessel**	**Fugitive Emissions Components**
Appledoorn 14-19H	Appledoorn 14 Pad	Yes	No	No	No	No	Yes	Yes
Bear Den 42-5TFH	Bear Den Pad	Yes	No	No	No	No	Yes	Yes
Ross 42-5H	Bear Den Pad	Yes	No	No	No	No	Yes	Yes
Ryan 42-5TFH	Bear Den Pad	Yes	No	No	No	No	Yes	Yes
Struthers USA 41-5H	Bear Den Pad	Yes	No	No	No	No	Yes	Yes
Beck 14-8H	Beck Pad	Yes	No	No	No	No	Yes	Yes
Beck 24-8H	Beck Pad	Yes	No	No	No	No	Yes	Yes
Brush 24-8H	Beck Pad	Yes	No	No	No	No	Yes	Yes
Double H 34-8TFH	Beck Pad	Yes	No	No	No	No	Yes	Yes
Torrison 24-8TFH	Beck Pad	Yes	No	No	No	No	Yes	Yes
Harley 14-36TFH	Big Head Pad (Stark CTB)	Yes	No	No	No	No	Yes	Yes
Houser 14-36H	Big Head Pad (Stark CTB)	Yes	No	No	No	No	Yes	Yes
Lund 44-35H	Big Head Pad (Stark CTB)	Yes	No	No	No	No	Yes	Yes
Stark 44-35TFH	Big Head Pad (Stark CTB)	Yes	No	No	No	No	Yes	Yes
Bingo 24-10TFH	Bingo Pad	Yes	No	No	No	No	Yes	Yes
Charlie 24-10H	Bingo Pad	Yes	No	No	No	No	Yes	Yes
JL Shobe 24-10TFH	Bingo Pad	Yes	No	No	No	No	Yes	Yes
Marjorie 14-10H	Bingo Pad	Yes	No	No	No	No	Yes	Yes
Chapman 31-15H	Chapman Pad	Yes	No	No	No	No	Yes	Yes
French 31-15TFH	Chapman Pad	Yes	No	No	No	No	Yes	Yes
Spring 21-15TFH	Chapman Pad	Yes	No	No	No	No	Yes	Yes
Charchenko 14-21H	Charchenko 14 Pad	Yes	No	No	No	No	No	Yes
Chimney Butte 34-11H	Chimney Butte Pad	Yes	No	No	No	No	Yes	Yes
Christensen 34-33H	Christensen Pad	Yes	No	No	No	No	Yes	Yes
Charmaine USA 14-35TFH	Clarks Creek USA Pad	Yes	No	No	No	No	Yes	Yes
Clarks Creek USA 14-35H	Clarks Creek USA Pad	Yes	No	No	No	No	Yes	Yes
Heather USA 13-35TFH	Clarks Creek USA Pad	Yes	No	No	No	No	Yes	Yes
Juanita USA 13-35H	Clarks Creek USA Pad	Yes	No	No	No	No	Yes	Yes

Appendix B – Affected Facility Information								
Well Name	**Facility Name**	**Well**	**Centrifugal Compressor**	**Reciprocating Compressor**	**Pneumatic Controller**	**Pneumatic Pump**	**Storage Vessel**	**Fugitive Emissions Components**
Gifford 34-11TFH	Connolly 31 pad	Yes	No	No	No	No	Yes	Yes
Hugo 34-11H	Connolly 31 Pad	Yes	No	No	No	No	Yes	Yes
Marlene 34-11TFH	Connolly 31 Pad	Yes	No	No	No	No	Yes	Yes
Tipton 34-11H	Connolly 31 Pad	Yes	No	No	No	No	Yes	Yes
Darcy 34-32H	Darcy Pad	Yes	No	No	No	No	Yes	Yes
Clarice USA 14-9H	Delia USA Pad	Yes	No	No	No	No	Yes	Yes
Delia USA 14-9TFH	Delia USA Pad	Yes	No	No	No	No	Yes	Yes
Wilbert 44-8H	Delia USA Pad	No	No	No	No	No	Yes	Yes
Eagle USA 41-5H	Eagle USA Pad	Yes	No	No	No	No	Yes	Yes
Crosby USA 41-6H	Eagle USA Pad	Yes	No	No	No	No	Yes	Yes
Alexander USA 44-33TFH	Earl Pennington USA Pad	Yes	No	No	No	No	Yes	Yes
Kattevold USA 14-34TFH	Earl Pennington USA Pad	Yes	No	No	No	No	Yes	Yes
Pfundheller USA 44-33H	Earl Pennington USA Pad	Yes	No	No	No	No	Yes	Yes
Martinez USA 24-8H	Felix USA Pad	Yes	No	No	No	No	Yes	Yes
Fred Hansen 34-8H	Fred Hansen Pad	Yes	No	No	No	No	Yes	Yes
Anton 34-33TFH	Goldberg USA Pad	Yes	No	No	No	No	Yes	Yes
Gaynor 34-33H	Goldberg USA Pad	Yes	No	No	No	No	Yes	Yes
Goldberg USA 24-33TFH	Goldberg USA Pad	Yes	No	No	No	No	Yes	Yes
Ronald 34-33TFH-2B	Goldberg USA Pad	Yes	No	No	No	No	Yes	Yes
Cunningham USA 31-4H	Grady USA Pad	Yes	No	No	No	No	Yes	Yes
Garness USA 31-4TFH-2B	Grady USA Pad	Yes	No	No	No	No	Yes	Yes
Grady USA 21-4H	Grady USA Pad	Yes	No	No	No	No	Yes	Yes
Marcella USA 21-4TFH	Grady USA Pad	Yes	No	No	No	No	Yes	Yes
Gravel Coulee 14-11TFH	Gravel Coulee Pad	Yes	No	No	No	No	Yes	Yes
McFadden 14-11H	Gravel Coulee Pad	Yes	No	No	No	No	Yes	Yes
Morrison 24-11H	Gravel Coulee Pad	Yes	No	No	No	No	Yes	Yes
Olea 24-11TFH	Gravel Coulee Pad	Yes	No	No	No	No	Yes	Yes
Sundby 24-11TFH	Gravel Coulee Pad	Yes	No	No	No	No	Yes	Yes
Demaray USA 41-2TFH	Hunts Along USA Pad	Yes	No	No	No	No	Yes	Yes

Appendix B – Affected Facility Information								
Well Name	**Facility Name**	**Well**	**Centrifugal Compressor**	**Reciprocating Compressor**	**Pneumatic Controller**	**Pneumatic Pump**	**Storage Vessel**	**Fugitive Emissions Components**
Hunts Along USA 12-1H	Hunts Along USA Pad	Yes	No	No	No	No	Yes	Yes
Mamie USA 21-1TFH	Hunts Along USA Pad	Yes	No	No	No	No	Yes	Yes
Mark USA 11-1H	Hunts Along USA Pad	Yes	No	No	No	No	Yes	Yes
Shoots USA 41-2H	Hunts Along USA Pad	Yes	No	No	No	No	Yes	Yes
Timothy USA 11-1TFH-2B	Hunts Along USA Pad	Yes	No	No	No	No	Yes	Yes
Kempf Trust 21-14H	Kempf Trust Pad	Yes	No	No	No	No	Yes	Yes
Arden USA 14-9TFH	Kermit USA Pad	Yes	No	No	No	No	Yes	Yes
Iron Woman USA 14-9H	Kermit USA Pad	Yes	No	No	No	No	Yes	Yes
Kermit USA 14-9H	Kermit USA Pad	Yes	No	No	No	No	Yes	Yes
Reno USA 24-9TFH-2B	Kermit USA Pad	Yes	No	No	No	No	Yes	Yes
Arkin 44-12TFH	Kevin Buehner 31 Pad	Yes	No	No	No	No	Yes	Yes
Bethol 34-7H	Kevin Buehner 31 Pad	Yes	No	No	No	No	Yes	Yes
Bronett 14-7H	Kevin Buehner 31 Pad	Yes	No	No	No	No	Yes	Yes
Ernst 14-7TFH	Kevin Buehner 31 Pad	Yes	No	No	No	No	Yes	Yes
Kenneth 24-7TFH	Kevin Buehner 31 Pad	Yes	No	No	No	No	Yes	Yes
Stroup 34-7TFH	Kevin Buehner 31 Pad	Yes	No	No	No	No	Yes	Yes
Darvey Klatt 44-22H	LaDonna Klatt Pad	No	No	No	No	No	Yes	Yes
Hollingsworth 24-22TFH	LaDonna Klatt Pad	No	No	No	No	No	Yes	Yes
LaDonna Klatt 24-22H	LaDonna Klatt Pad	No	No	No	No	No	Yes	Yes
Mattie 14-22TFH	LaDonna Klatt Pad	No	No	No	No	No	Yes	Yes
Larry Repp 31-16H	Larry Repp Pad	Yes	No	No	No	No	No	Yes
Hondo 34-12TFH	Marlin 14 Pad	Yes	No	No	No	No	Yes	Yes
Marlin 24-12H	Marlin 14 Pad	Yes	No	No	No	No	Yes	Yes
Mittelstadt 34-12H	Marlin 14 Pad	Yes	No	No	No	No	Yes	Yes
Mary Hansen 14-9H	Mary Hansen Pad	Yes	No	No	No	No	No	Yes
Mikkelsen 11-14H	Mikkelsen Pad	Yes	No	No	No	No	Yes	Yes
Lacey USA 11-5H	Moline Pad	Yes	No	No	No	No	Yes	Yes
Moline 14-32H	Moline Pad	Yes	No	No	No	No	Yes	Yes
Oneil 24-24H	Oneil 24 Pad	Yes	No	No	No	No	Yes	Yes

Appendix B – Affected Facility Information								
Well Name	**Facility Name**	**Well**	**Centrifugal Compressor**	**Reciprocating Compressor**	**Pneumatic Controller**	**Pneumatic Pump**	**Storage Vessel**	**Fugitive Emissions Components**
Oneil 34-24H	Oneil 34 Pad	Yes	No	No	No	No	Yes	Yes
Oscar Stohler 41-4H	Oscar Stohler	Yes	No	No	No	No	Yes	Yes
Homme 11-18TFH	Pearl Pad	Yes	No	No	No	No	No	Yes
Shrader 41-13H	Pearl Pad	Yes	No	No	No	No	No	Yes
Pelton 24-31H	Pelton Pad	Yes	No	No	No	No	Yes	Yes
Quill 34-11H	Quill Pad	Yes	No	No	No	No	No	Yes
Colvin USA 14-34TFH	Ranger USA Pad	Yes	No	No	No	No	Yes	Yes
Lois USA 14-34H	Ranger USA Pad	Yes	No	No	No	No	Yes	Yes
Ranger USA 24-34TFH	Ranger USA Pad	Yes	No	No	No	No	Yes	Yes
Hannah USA 31-4TFH	Raymond USA Pad	Yes	No	No	No	No	Yes	Yes
Maggie USA 21-4H	Raymond USA Pad	Yes	No	No	No	No	Yes	Yes
Raymond USA 41-4H	Raymond USA Pad	Yes	No	No	No	No	Yes	Yes
Rufus USA 21-4TFH	Raymond USA Pad	Yes	No	No	No	No	Yes	Yes
Repp 34-34H	Repp Pad	Yes	No	No	No	No	Yes	Yes
Repp Trust 34-9H	Repp Trust Pad	Yes	No	No	No	No	No	Yes
Ringer 14-21TFH	Ringer Pad	Yes	No	No	No	No	Yes	Yes
Trinity 14-21H	Ringer Pad	Yes	No	No	No	No	Yes	Yes
Ulmer 24-21H	Ringer Pad	Yes	No	No	No	No	Yes	Yes
Wilhelm 24-21TFH	Ringer Pad	Yes	No	No	No	No	Yes	Yes
Chauncey USA 31-2H	Sherman USA Pad	Yes	No	No	No	No	Yes	Yes
June USA 31-2H	Sherman USA Pad	Yes	No	No	No	No	Yes	Yes
Miles USA 41-2TFH-2B	Sherman USA Pad	Yes	No	No	No	No	Yes	Yes
Wilbur USA 31-2TFH	Sherman USA Pad	Yes	No	No	No	No	Yes	Yes
Winona USA 21-2TFH-2B	Sherman USA Pad	Yes	No	No	No	No	Yes	Yes
Hillesland 31-3TFH	Stohler 41 Pad	Yes	No	No	No	No	Yes	Yes
Rita 41-3TFH	Stohler 41 Pad	Yes	No	No	No	No	Yes	Yes
Stanton 41-3H	Stohler 41 Pad	Yes	No	No	No	No	Yes	Yes
Begola USA 34-22H	TAT USA 34 Pad	Yes	No	No	No	No	Yes	Yes
Forsman USA 44-22H	TAT USA 34 Pad	Yes	No	No	No	No	Yes	Yes

Appendix B – Affected Facility Information								
Well Name	**Facility Name**	**Well**	**Centrifugal Compressor**	**Reciprocating Compressor**	**Pneumatic Controller**	**Pneumatic Pump**	**Storage Vessel**	**Fugitive Emissions Components**
Lockwood USA 44-22TFH	TAT USA 34 Pad	Yes	No	No	No	No	Yes	Yes
Murphy USA 34-22TFH-2B	TAT USA 34 Pad	Yes	No	No	No	No	Yes	Yes
TAT USA 34-22H	TAT USA 34 Pad	Yes	No	No	No	No	Yes	Yes
Tescher 11-27H	Tescher Pad	Yes	No	No	No	No	Yes	Yes
Trotter 14-23H	Trotter Pad	Yes	No	No	No	No	Yes	Yes
Lena USA 14-22H	Veronica USA	Yes	No	No	No	No	Yes	Yes
Blue Creek USA 24-22TFH-2B	Veronica USA Pad	Yes	No	No	No	No	Yes	Yes
Deane USA 24-22H	Veronica USA Pad	Yes	No	No	No	No	Yes	Yes
Rough Coulee USA 24-22TFH	Veronica USA Pad	Yes	No	No	No	No	Yes	Yes
TAT USA 14-22H	Veronica USA Pad	Yes	No	No	No	No	Yes	Yes
Veronica USA 14-22TFH	Veronica USA Pad	Yes	No	No	No	No	Yes	Yes
Voigt 11-15H	Voigt Pad	Yes	No	No	No	No	Yes	Yes
Kukla 34-34H	William Kukla Pad	Yes	No	No	No	No	Yes	Yes
Wm. And Agnes Scott 14-25H	Wm & Agnes Scott Pad	Yes	No	No	No	No	No	Yes
Cantrill USA 11-29TFH	Annie USA Pad (Annie USA CTB)	Yes	No	No	No	No	No	Yes
Honaker USA 41-30TFH	Annie USA Pad (Zelda CTB)	Yes	No	No	No	No	Yes	Yes
Zelda USA 11-29H	Annie USA Pad (Zelda CTB)	Yes	No	No	No	No	Yes	Yes
Arthur 24-35H	Arthur Pad	Yes	No	No	No	No	Yes	Yes
Lawrence 34-35H	Arthur Pad	Yes	No	No	No	No	Yes	Yes
Rummel 24-35TFH	Arthur Pad	Yes	No	No	No	No	Yes	Yes
Wickett 24-35TFH	Arthur Pad	Yes	No	No	No	No	Yes	Yes
Axell USA 34-19TFH	Axell USA Pad	Yes	No	No	No	No	Yes	Yes
Charles Shobe USA 44-19H	Axell USA Pad	Yes	No	No	No	No	Yes	Yes
Rue USA 44-19TFH	Axell USA Pad	Yes	No	No	No	No	Yes	Yes
Sibyl USA 44-19TFH	Axell USA Pad	Yes	No	No	No	No	Yes	Yes
Berry USA 21-18H	Baker USA Pad	Yes	No	No	No	No	Yes	Yes
Grant USA 21-18TFH	Baker USA Pad	Yes	No	No	No	No	Yes	Yes
Greybull USA 31-18TFH	Baker USA Pad	Yes	No	No	No	No	Yes	Yes
Birds Bill USA 41-2TFH	Big Head Pad (Big Head CTB)	Yes	No	No	No	No	No	Yes

Appendix B – Affected Facility Information								
Well Name	**Facility Name**	**Well**	**Centrifugal Compressor**	**Reciprocating Compressor**	**Pneumatic Controller**	**Pneumatic Pump**	**Storage Vessel**	**Fugitive Emissions Components**
Bears Arm USA 41-2H	Big Head Pad (Big Head CTB)	Yes	No	No	No	No	No	Yes
Big Head USA 41-2TFH	Big Head Pad (Big Head CTB)	Yes	No	No	No	No	No	Yes
Bill Connolly 21-25H	Bill Connolly Pad	Yes	No	No	No	No	Yes	Yes
Burshia USA 14-7H	Burshia USA Pad	Yes	No	No	No	No	Yes	Yes
Dearborn USA 24-7TFH	Burshia USA Pad	Yes	No	No	No	No	Yes	Yes
McKinley USA 24-7TFH	Burshia USA Pad	Yes	No	No	No	No	Yes	Yes
Monteau USA 34-7H	Burshia USA Pad	Yes	No	No	No	No	Yes	Yes
Clara USA 11-23TFH-2B	Clara USA Pad	Yes	No	No	No	No	Yes	Yes
Michelle USA 14-14TFH	Clara USA Pad	Yes	No	No	No	No	Yes	Yes
Phyllis USA 11-23H	Clara USA Pad	Yes	No	No	No	No	Yes	Yes
TAT USA 12-23H	Clara USA Pad	Yes	No	No	No	No	Yes	Yes
Connie Connolly 21-26H	Connie Connolly Pad	Yes	No	No	No	No	Yes	Yes
Oren USA 31-6TFH	Cummings USA Pad	Yes	No	No	No	No	No	Yes
Debbie Baklenko USA 12-26H	Debbie Baklenko USA Pad	Yes	No	No	No	No	Yes	Yes
Galen Fox USA 24-7H	Galen Fox USA Pad	Yes	No	No	No	No	Yes	Yes
Drake 44-16H	Gloria Pad	Yes	No	No	No	No	Yes	Yes
Gloria 24-16H	Gloria Pad	Yes	No	No	No	No	Yes	Yes
Northrop 34-16H	Gloria Pad	Yes	No	No	No	No	Yes	Yes
Veddy 44-16H	Gloria Pad	Yes	No	No	No	No	Yes	Yes
Goodall USA 11-29H	Goodall USA Pad	Yes	No	No	No	No	No	Yes
Wilkinson USA 11-1H	Howard USA Pad	Yes	No	No	No	No	Yes	Yes
Deserly USA 11-1TFH	Howard USA Pad	Yes	No	No	No	No	Yes	Yes
Dutton USA 21-1TFH	Howard USA Pad	Yes	No	No	No	No	Yes	Yes
Fannie USA 21-1H	Howard USA Pad	Yes	No	No	No	No	Yes	Yes
Howard USA 11-1H	Howard USA Pad	Yes	No	No	No	No	Yes	Yes
Four Dances USA 41-25TFH	Irish USA Pad	Yes	No	No	No	No	Yes	Yes
Gretchen USA 11-30H	Irish USA Pad	Yes	No	No	No	No	Yes	Yes
Irish USA 41-25TFH	Irish USA Pad	Yes	No	No	No	No	Yes	Yes
Snowman USA 41-25H	Irish USA Pad	Yes	No	No	No	No	Yes	Yes

Appendix B – Affected Facility Information								
Well Name	**Facility Name**	**Well**	**Centrifugal Compressor**	**Reciprocating Compressor**	**Pneumatic Controller**	**Pneumatic Pump**	**Storage Vessel**	**Fugitive Emissions Components**
Bobby Lee USA 41-30H	Joanne Quale USA Pad	Yes	No	No	No	No	Yes	Yes
Coburn USA 41-30TFH	Joanne Quale USA Pad	Yes	No	No	No	No	Yes	Yes
Joanne Quale USA 21-30H	Joanne Quale USA Pad	Yes	No	No	No	No	Yes	Yes
Maleckar USA 31-30H	Joanne Quale USA Pad	Yes	No	No	No	No	Yes	Yes
Sheldon USA 21-30TFH	Joanne Quale USA Pad	Yes	No	No	No	No	Yes	Yes
Skadeland USA 31-30TFH	Joanne Quale USA Pad	Yes	No	No	No	No	Yes	Yes
Wendell USA 31-30H	Joanne Quale USA Pad	Yes	No	No	No	No	Yes	Yes
Dye USA 14-14TFH-2B	Jones USA Pad	Yes	No	No	No	No	Yes	Yes
Briek USA 13-14H	Jones USA Pad	Yes	No	No	No	No	Yes	Yes
Hammerberg USA 14-14H	Jones USA Pad	Yes	No	No	No	No	Yes	Yes
Jones USA 14-14H	Jones USA Pad	Yes	No	No	No	No	Yes	Yes
Julia Jones USA 13-14TFH	Jones USA Pad	Yes	No	No	No	No	Yes	Yes
Nora Jones USA 12-14TFH-2B	Jones USA Pad	Yes	No	No	No	No	Yes	Yes
Kinney 24-36TFH	Kent Carlson 14 Pad	Yes	No	No	No	No	Yes	Yes
Blanche 14-36H	Kent Carlson 14 Pad	Yes	No	No	No	No	Yes	Yes
Jocelyn 14-36TFH	Kent Carlson 14 Pad	Yes	No	No	No	No	Yes	Yes
Hartvig 14-8TFH	Lars Pad	Yes	No	No	No	No	Yes	Yes
Lars 14-8H	Lars Pad	Yes	No	No	No	No	Yes	Yes
Eunice USA 11-16TFH	Luther-Weidman USA CTB Pad	Yes	No	No	No	No	Yes	Yes
Flynn USA 21-16TFH	Luther-Weidman USA CTB Pad	Yes	No	No	No	No	Yes	Yes
Gartland USA 31-16H	Luther-Weidman USA CTB Pad	Yes	No	No	No	No	Yes	Yes
Hurkes USA 41-16TFH	Luther-Weidman USA CTB Pad	Yes	No	No	No	No	Yes	Yes
Linton USA 31-16TFH	Luther-Weidman USA CTB Pad	Yes	No	No	No	No	Yes	Yes
Reyes USA 21-16H	Luther-Weidman USA CTB Pad	Yes	No	No	No	No	Yes	Yes
Sears USA 21-16TFH	Luther-Weidman USA CTB Pad	Yes	No	No	No	No	Yes	Yes
Weidman USA 11-15TFH	Luther-Weidman USA CTB Pad	Yes	No	No	No	No	Yes	Yes
White Owl USA 41-16H	Luther-Weidman USA CTB Pad	Yes	No	No	No	No	Yes	Yes
Gwen 44-36TFH	Mason Pad	Yes	No	No	No	No	Yes	Yes
Hayes 14-31H	Mason Pad	Yes	No	No	No	No	Yes	Yes

Appendix B – Affected Facility Information								
Well Name	**Facility Name**	**Well**	**Centrifugal Compressor**	**Reciprocating Compressor**	**Pneumatic Controller**	**Pneumatic Pump**	**Storage Vessel**	**Fugitive Emissions Components**
Mason 14-31TFH	Mason Pad	Yes	No	No	No	No	Yes	Yes
Ballmeyer USA 41-17TFH	Ness USA Pad	Yes	No	No	No	No	Yes	Yes
Becky USA 21-17TFH	Ness USA Pad	Yes	No	No	No	No	Yes	Yes
Hans USA 31-17TFH	Ness USA Pad	Yes	No	No	No	No	Yes	Yes
Ness USA 31-17H	Ness USA Pad	Yes	No	No	No	No	Yes	Yes
Hal USA 34-34H	Ranger USA Pad	Yes	No	No	No	No	Yes	Yes
Jackie USA 34-34TFH	Ranger USA Pad	Yes	No	No	No	No	Yes	Yes
Lois USA 14-34H	Ranger USA Pad	Yes	No	No	No	No	Yes	Yes
McMahon USA 14-34H	Ranger USA Pad	Yes	No	No	No	No	Yes	Yes
Ranger USA 24-34TFH	Ranger USA Pad	Yes	No	No	No	No	Yes	Yes
Tony USA 24-34H	Ranger USA Pad	Yes	No	No	No	No	Yes	Yes
Weninger USA 44-34H	Ranger USA Pad	Yes	No	No	No	No	Yes	Yes
Brant USA 44-34TFH	Ranger USA Pad	Yes	No	No	No	No	Yes	Yes
Loftquist USA 34-34TFH	Ranger USA Pad	Yes	No	No	No	No	Yes	Yes
Atkinson USA 31-17TFH	Red Feather USA Pad	Yes	No	No	No	No	Yes	Yes
Bruhn USA 21-17H	Red Feather USA Pad	Yes	No	No	No	No	Yes	Yes
Driftwood USA 41-17H	Red Feather USA Pad	Yes	No	No	No	No	Yes	Yes
Miriam USA 11-17H	Red Feather USA Pad	Yes	No	No	No	No	Yes	Yes
Red Feather USA 21-17H	Red Feather USA Pad	Yes	No	No	No	No	Yes	Yes
Red Feather USA 31-17H	Red Feather USA Pad	Yes	No	No	No	No	Yes	Yes
Rochelle USA 21-17TFH	Red Feather USA Pad	Yes	No	No	No	No	Yes	Yes
Turkey Feet USA 41-17TFH	Red Feather USA Pad	Yes	No	No	No	No	Yes	Yes
Klaus 11-28H	Ringer Pad	Yes	No	No	No	No	Yes	Yes
Otis 11-28TFH	Ringer Pad	Yes	No	No	No	No	Yes	Yes
Higgins 31-26TFH	Rosa Benz Pad	Yes	No	No	No	No	Yes	Yes
Meredith 14-24H	Rosa Benz Pad	Yes	No	No	No	No	Yes	Yes
Ruth 44-23TFH	Rosa Benz Pad	Yes	No	No	No	No	Yes	Yes
Snider 41-26TFH	Rosa Benz Pad	Yes	No	No	No	No	Yes	Yes
Charles Shobe USA 44-19H	Axell USA Pad	Yes	No	No	No	No	Yes	Yes

Appendix B – Affected Facility Information								
Well Name	**Facility Name**	**Well**	**Centrifugal Compressor**	**Reciprocating Compressor**	**Pneumatic Controller**	**Pneumatic Pump**	**Storage Vessel**	**Fugitive Emissions Components**
Martha Grube USA 14-20H	Shobe Pad	Yes	No	No	No	No	Yes	Yes
Nugget USA 14-20TFH	Shobe Pad	Yes	No	No	No	No	Yes	Yes
State Eggert 24-36H	State Eggert Pad	Yes	No	No	No	No	Yes	Yes
State Eileen 34-36TFH	State Eggert Pad	Yes	No	No	No	No	Yes	Yes
State Elias 34-36TFH	State Eggert Pad	Yes	No	No	No	No	Yes	Yes
State Etta 44-36H	State Eggert Pad	Yes	No	No	No	No	Yes	Yes
State Kelling 14-36TFH	State Kreiger Pad	Yes	No	No	No	No	Yes	Yes
State Kreiger 14-36H	State Kreiger Pad	Yes	No	No	No	No	Yes	Yes
State Oster 14-36TFH	State Kreiger Pad	Yes	No	No	No	No	Yes	Yes
Jerome USA 12-23TFH	TAT USA 13 Pad	Yes	No	No	No	No	Yes	Yes
Joshua USA 13-23TFH-2B	TAT USA 13 Pad	Yes	No	No	No	No	Yes	Yes
Lamarr USA 13-23TFH	TAT USA 13 Pad	Yes	No	No	No	No	Yes	Yes
Loren USA 14-23TFH	TAT USA 13 Pad	Yes	No	No	No	No	Yes	Yes
Whitebody USA 14-23H	TAT USA 13 Pad	Yes	No	No	No	No	Yes	Yes
Yellowface USA 13-23H	TAT USA 13 Pad	Yes	No	No	No	No	Yes	Yes
Gudmon 44-35TFH	Two Bar Pad	Yes	No	No	No	No	Yes	Yes
Lucas 34-35TFH	Two Bar Pad	Yes	No	No	No	No	Yes	Yes
Rafter X 44-35H	Two Bar Pad	Yes	No	No	No	No	Yes	Yes
Two Bar 34-35H	Two Bar Pad	Yes	No	No	No	No	Yes	Yes
Catherine 44-35H	Two Bar Pad	Yes	No	No	No	No	Yes	Yes
McCrory 44-35TFH	Two Bar Pad	Yes	No	No	No	No	Yes	Yes
Walking Eagle USA 44-12TFH	Yellow Otter USA pad	Yes	No	No	No	No	Yes	Yes
Yellow Otter USA 14-7TFH	Yellow Otter USA Pad	Yes	No	No	No	No	Yes	Yes
Young Woman USA 44-12H	Yellow Otter USA Pad	Yes	No	No	No	No	Yes	Yes

Appendix C – Well Completions with Hydraulic Fracturing

Appendix C – Well Completions with Hydraulic Fracturing									
Well/Facility Name	**API Number**	**Flare Monitoring Records Deviations.**	**Date and Time Flow back Onset**	**Date and Time of Flow back to Separator**	**Date and Time Returning to the Initial Flow back Stage**	**Date and Time Flow back Ended**	**Duration of Flow back**	**Duration and Disposition**	**Recovery/Combustion/ Venting**
Arthur 24-35H	33-025-03341	--	4/25/19 3:05 AM	4/25/19 11:00 PM	4/26/19 11:00 AM	5/10/19 9:18 AM	366.22		Combustion 252.30
			--	4/30/19 9:00 AM	--	--	--		--
Atkinson USA 31-17TFH	33-061-04224	--	5/8/19 6:14 PM	5/8/19 11:00 PM	5/9/19 6:40 PM	5/25/19 12:00 AM	389.77		Combustion 168.83
			--	5/18/19 6:35 PM	5/18/19 9:15 PM	--	--		--
			--	5/18/19 9:30 PM	--	--	--		--
Axell USA 34-19TFH	33-061-04119	Pilot flame monitoring records incomplete	9/14/18 8:00 PM	9/14/18 9:00 PM	9/15/18 10:00 PM	10/9/18 6:00 AM	586.00		Combustion 184.00
			--	10/2/18 1:00 PM	10/3/18 7:45 AM	--	--		--
			--	10/3/18 9:45 AM	--	--	--		--
Ballmeyer USA 41-17TFH	33-061-03841	--	11/2/18 10:50 PM	11/2/18 11:00 PM	11/3/18 7:00 AM	11/30/18 6:00 AM	655.17		Combustion 255.50
			--	11/3/18 7:30 AM	11/4/18 8:00 AM	--	--		--
			--	11/20/18 12:00 PM	11/28/18 10:00 AM	--	--		--
			--	11/28/18 9:00 PM	--	--	--		--
Bears Arm USA 41-2H	33-061-04061	Pilot flame monitoring records incomplete	1/23/19 3:00 PM	1/23/19 4:00 PM	1/23/19 9:00 PM	2/11/19 11:00 AM	452.00		Combustion 278.33
			--	1/31/19 5:00 PM	2/1/19 9:00 PM	--	--		--

Appendix C – Well Completions with Hydraulic Fracturing								
Well/Facility Name	**API Number**	**Flare Monitoring Records Deviations.**	**Date and Time Flow back Onset**	**Date and Time of Flow back to Separator**	**Date and Time Returning to the Initial Flow back Stage**	**Date and Time Flow back Ended**	**Duration of Flow back**	**Duration and Disposition Recovery/Combustion/ Venting**
			--	2/1/19 5:40 AM	--	--	--	--
Becky USA 21-17tFH	33-061-03838	Pilot flame monitoring records incomplete	10/15/18 5:00 PM	10/15/18 10:40 PM	10/16/18 12:30 AM	11/2/18 6:00 AM	421.00	Combustion 159.83
			--	10/16/18 4:00 AM	10/17/18 2:00 AM	--	--	--
			--	10/27/18 2:00 PM	--	--	--	--
Berry USA 21-18H	33-061-04163	--	3/2/19 3:50 AM	3/2/19 10:00 AM	3/3/19 2:00 PM	3/12/19 9:00 AM	245.17	Combustion 171.00
			--	3/16/19 10:00 AM	--	--	--	--
Big Head USA 41-2TFH	33-061-04026	Pilot flame monitoring records incomplete	1/21/19 11:00 PM	1/22/19 12:00 AM	1/23/19 4:50 AM	2/18/19 11:00 AM	660.00	Combustion 217.83
			--	2/10/19 2:00 PM	--	--	--	--
Bill Connolly 21-25H	33-025-00650	--	3/27/19 11:20 AM	3/29/19 9:00 PM	3/30/19 6:15 AM	4/10/19 10:00 AM	334.67	Combustion 276.75
			--	3/30/19 6:30 AM	--	--	--	--
Birds Bill USA 41-2TFH	33-061-04027	--	1/25/19 12:00 PM	1/28/19 2:00 PM	--	2/9/19 8:00 AM	356.00	Combustion 282.00
Blanche 14-36H	33-025-03756	--	7/20/19 3:00 PM	7/20/19 3:00 PM	7/20/19 7:36 PM	7/25/19 8:10 AM	113.17	Combustion 110.43
			--	7/20/19 10:00 PM	7/22/19 4:40 AM	--	--	--
			--	7/22/19 5:00 AM	--	--	--	--

Appendix C – Well Completions with Hydraulic Fracturing

Well/Facility Name	API Number	Flare Monitoring Records Deviations.	Date and Time Flow back Onset	Date and Time of Flow back to Separator	Date and Time Returning to the Initial Flow back Stage	Date and Time Flow back Ended	Duration of Flow back	Duration and Disposition Recovery/Combustion/ Venting
Bobby Lee USA 41-30H	33-053-04673	--	12/28/18 7:50 PM	12/28/18 9:00 PM	12/29/18 8:35 PM	2/2/19 6:00 AM	850.17	Combustion 280.58
Brant USA 44-34TFH	33-061-03966	--	7/28/18 11:00 PM	7/29/18 2:30 AM	7/30/19 8:20 AM	8/17/18 1:00 AM	458.00	Combustion 374.83
			--	8/2/18 2:00 PM	8/4/18 5:00 PM	--	--	--
			--	8/4/19 7:00 PM	--	--	--	--
Briek USA 13-14H	33-053-08224	Pilot flame monitoring records incomplete	9/11/18 2:00 AM	9/11/18 5:00 AM	9/12/18 2:00 PM	11/18/18 6:00 AM	1636.00	Combustion 292.00
			--	11/7/18 11:00 AM	--	--	--	--
Bruhn USA 21-17H	33-061-04223	--	5/14/19 3:00 PM	5/14/19 4:00 PM	--	5/24/19 9:00 AM	234.00	Combustion 233.00
Burshia USA 14-7H	33-061-04171	--	3/12/19 11:00 PM	3/14/19 11:00 PM	3/15/19 5:30 AM	3/31/19 1:00 AM	434.00	Combustion 373.50
			--	3/15/19 6:00 PM	--	--	--	--
Cantrill USA 11-29TFH	33-053-08136	Pilot flame monitoring records incomplete	12/25/18 4:00 PM	12/25/18 8:00 PM	12/26/18 7:00 PM	1/12/19 6:00 AM	422.00	Combustion 220.00
			--	1/3/19 4:00 PM	1/4/19 12:00 AM	--	--	--
			--	1/4/19 9:00 AM	--	--	--	--
Catherine 44-35H	33-025-03559	--	4/8/19 1:00 PM	4/12/19 2:00 PM	--	4/20/19 9:00 AM	284.00	Combustion 187.00

Appendix C – Well Completions with Hydraulic Fracturing									
Well/Facility Name	API Number	Flare Monitoring Records Deviations.	Date and Time Flow back Onset	Date and Time of Flow back to Separator	Date and Time Returning to the Initial Flow back Stage	Date and Time Flow back Ended	Duration of Flow back	Duration and Disposition	Recovery/Combustion/ Venting
Charles Shobe USA 44-19H	33-061-00849	Pilot flame monitoring records incomplete	9/17/18 4:00 AM	9/17/18 8:00 AM	9/18/18 6:00 AM	10/1/18 1:00 AM	333.00	Combustion 198.00	
			--	9/21/18 12:00 PM	9/22/18 1:00 PM	--	--	--	
			--	9/22/18 5:00 PM	9/27/18 2:00 AM	--	--	--	
			--	9/29/18 3:00 AM	--	--	--	--	
Clara USA 11-23TFH-2B	33-053-08160	--	10/21/18 8:00 PM	10/21/18 11:00 PM	10/22/18 10:00 PM	11/1/18 1:00 AM	245.00	Combustion 225.00	
			--	10/23/18 2:00 PM	10/24/18 1:00 PM	--	--	--	
			--	10/24/18 2:00 PM	--	--	--	--	
Coburn USA 41-30TFH	33-053-04672	--	12/27/18 10:00 AM	12/27/18 1:00 PM	12/28/18 6:45 AM	1/26/19 6:00 AM	716.00	Combustion 246.75	
			--	1/16/19 4:00 PM	1/24/19 12:00 PM	--	--	--	
			--	1/24/19 1:00 PM	--	--	--	--	
Connie Connolly 21-26H	33-025-00806	Pilot flame monitoring records incomplete	4/21/19 5:00 AM	4/23/19 10:00 AM	4/27/19 2:00 PM	5/6/19 1:00 PM	368.0	Combustion 295.0	
			--	4/28/19 10:00 AM	--	--	--	--	
Dearborn USA 24-7TFH	33-061-04172	--	3/1/19 12:00 PM	3/12/19 4:00 AM	3/12/19 12:00 PM	3/27/19 11:00 AM	623.0	Combustion 217.0	

Appendix C – Well Completions with Hydraulic Fracturing									
Well/Facility Name	**API Number**	**Flare Monitoring Records Deviations.**	**Date and Time Flow back Onset**	**Date and Time of Flow back to Separator**	**Date and Time Returning to the Initial Flow back Stage**	**Date and Time Flow back Ended**	**Duration of Flow back**	**Duration and Disposition**	**Recovery/Combustion/ Venting**
			--	3/18/19 6:00 PM	--	--	--	--	
Debbie Baklenko USA 12-26H	33-053-03330	--	12/8/18 3:00 PM	12/8/18 4:00 PM	--	12/21/18 1:00 AM	298.0	Combustion 297.0	
Deserly USA 11-1TFH	33-061-04063	Pilot flame monitoring records incomplete	1/19/19 7:00 PM	1/19/19 7:13 PM	1/20/19 7:20 PM	2/10/19 6:00 AM	515.0	Combustion 238.8	
			--	1/31/19 6:00 PM	2/4/19 1:40 AM	--	--	--	
			--	2/4/19 3:00 PM	--	--	--	--	
Drake 44-16H	33-025-03455	--	11/2/18 5:00 AM	11/2/18 9:00 AM	11/3/18 9:00 AM	11/29/18 6:00 AM	649.0	Combustion 373.0	
			--	11/13/18 5:00 PM	11/16/18 9:00 AM	--	--	--	
			--	11/17/18 9:00 AM	--	--	--	--	
Driftwood USA 41-17H	33-061-04264	--	5/25/19 8:00 AM	5/25/19 9:00 AM	5/25/19 3:25 PM	7/15/19 11:00 PM	1239.0	Combustion 1228.9	
			--	5/25/19 10:00 PM	5/26/19 12:00 PM	--	--	--	
			--	5/26/19 4:00 PM	5/27/19 3:30 PM	--	--	--	
			--	5/27/19 4:00 PM	--	--	--	--	
Dutton USA 21-1TFH	33-061-04064	--	2/6/19 4:00 PM	2/6/19 4:01 PM	--	2/16/19 3:00 PM	239.00	Combustion 239.0	
Dye USA 14-14TFH-2B	33-053-08226	Pilot flame monitoring records incomplete	9/24/18 7:00 PM	9/24/18 7:01 PM	9/26/18 7:00 PM	10/18/18 7:00 AM	564.00	Combustion 307.0	

Appendix C – Well Completions with Hydraulic Fracturing								
Well/Facility Name	**API Number**	**Flare Monitoring Records Deviations.**	**Date and Time Flow back Onset**	**Date and Time of Flow back to Separator**	**Date and Time Returning to the Initial Flow back Stage**	**Date and Time Flow back Ended**	**Duration of Flow back**	**Duration and Disposition Recovery/Combustion/ Venting**
			--	10/7/18 12:00 PM	--	--	--	--
Eunice USA 11-16TFH	33-061-04263	--	5/24/19 11:00 AM	5/24/19 11:01 AM	--	5/30/19 9:00 AM	142.00	Combustion 141.98
Fannie USA 21-1H	33-061-04065	Pilot flame monitoring records incomplete	1/4/19 1:00 AM	1/4/19 12:15 PM	1/5/19 3:00 AM	2/18/19 1:00 PM	1092.00	Combustion 183.75
			--	2/11/19 12:00 PM	--	--	--	--
Flynn USA 21-16TFH	33-061-04262	--	5/25/19 11:00 AM	5/25/19 1:00 PM	--	6/6/19 8:00 AM	285.00	Combustion 283.00
Four Dances USA 41-25TFH	33-053-08049	--	12/18/18 12:30 PM	12/18/18 1:00 PM	--	12/23/18 2:00 PM	121.50	Combustion 121.00
Galen Fox USA 24-7H	33-061-01388	--	3/6/19 6:00 AM	3/6/19 5:00 PM	3/7/19 6:00 AM	3/15/19 11:00 AM	221.00	Sale167.00/ Combustion 32.00
			--	3/7/19 5:00 PM	--	--	--	--
Gartland USA 31-16H	33-061-04259	--	6/6/19 2:00 PM	6/6/19 4:00 PM	6/11/19 8:00 AM	6/18/19 6:00 AM	280.00	Combustion 276.00
			--	6/11/19 10:00 AM	--	--	--	--
Gloria 24-16H	33-025-03500	--	10/11/18 2:00 PM	10/13/18 4:00 PM	--	10/30/18 1:00 PM	455.00	Combustion 405.00
Goodall USA 11-29H	33-053-03192	Pilot flame monitoring records incomplete	12/6/18 9:10 PM	12/7/18 12:30 AM	12/7/18 10:00 PM	12/17/18 1:00 PM	255.83	Sales 192.17/ Combustion 42.33
			--	12/8/18 4:00 PM	--	--	--	--

Appendix C – Well Completions with Hydraulic Fracturing								
Well/Facility Name	**API Number**	**Flare Monitoring Records Deviations.**	**Date and Time Flow back Onset**	**Date and Time of Flow back to Separator**	**Date and Time Returning to the Initial Flow back Stage**	**Date and Time Flow back Ended**	**Duration of Flow back**	**Duration and Disposition Recovery/Combustion/ Venting**
Grant USA 21-18TFH	33-061-04162	Pilot flame monitoring records incomplete	2/27/19 7:00 AM	2/28/19 12:00 AM	2/28/19 10:00 AM	3/9/19 6:00 AM	239.00	Combustion 190.00
			--	2/28/19 5:00 PM	3/1/19 2:00 PM	--	--	--
			--	3/2/19 3:00 PM	--	--	--	--
Gretchen USA 11-30H	33-053-08050	--	12/18/18 11:59 AM	12/18/18 12:00 PM	--	1/1/19 6:00 AM	330.02	Combustion 330.00
Greybull USA 31-18TFH	33-061-04164	Pilot flame monitoring records incomplete	3/4/19 1:15 PM	3/4/19 2:00 PM	3/5/19 2:00 PM	3/20/19 2:00 PM	384.75	Combustion 215.00
			--	3/12/19 3:00 PM	--	--	--	--
Gudmon 44-35TFH	33-025-03357	Pilot flame monitoring records incomplete	3/22/19 6:00 PM	3/23/19 1:00 AM	3/24/19 12:00 AM	4/18/19 3:00 PM	645.00	Combustion 528.00
			--	3/28/19 2:00 PM	--	--	--	--
Gwen 44-36TFH	33-025-03584	--	7/1/19 7:00 PM	7/1/19 7:15 PM	--	7/7/19 12:00 PM	137.00	Combustion 136.75
Hal USA 34-34H	33-061-03836	--	8/5/18 6:00 PM	8/5/18 9:00 PM	8/6/18 6:00 PM	10/19/18 12:00 AM	1782.0	Sales 216/ Combustion 1017
			--	8/22/18 5:00 PM	8/26/18 11:20 AM	--	--	--
			--	8/26/18 12:00 PM	--	--	--	--
Hammerberg USA 14-14H	33-053-08227	Pilot flame monitoring records incomplete	9/28/18 10:00 AM	9/28/18 1:00 PM	9/30/18 9:00 AM	10/23/18 5:00 AM	595.00	Combustion 293.00

Appendix C – Well Completions with Hydraulic Fracturing								
Well/Facility Name	**API Number**	**Flare Monitoring Records Deviations.**	**Date and Time Flow back Onset**	**Date and Time of Flow back to Separator**	**Date and Time Returning to the Initial Flow back Stage**	**Date and Time Flow back Ended**	**Duration of Flow back**	**Duration and Disposition Recovery/Combustion/ Venting**
			--	10/12/18 8:00 PM	--	--	--	--
Hans USA 31-17TFH	33-061-03839	--	11/8/18 8:00 PM	11/8/18 10:30 PM	11/10/18 8:00 AM	11/20/18 5:00 AM	273.00	Combustion 245.25
			--	11/11/18 9:00 AM	11/12/18 11:25 PM	--	--	--
			--	11/12/18 11:40 PM	--	--	--	--
Hartvig 14-8TFH	33-025-03443	--	8/12/18 8:00 AM	8/12/18 8:01 AM	8/19/18 6:45 AM	8/20/18 3:00 PM	199.00	Combustion 196.73
			--	8/19/18 9:00 AM	--	--	--	--
Hayes 14-31H	33-025-03583	--	6/22/19 9:30 PM	6/23/19 1:00 PM	6/24/19 5:00 AM	7/11/19 6:00 PM	452.50	Combustion 428.67
			--	6/24/19 1:00 PM	6/30/19 2:00 PM	--	--	--
			--	6/30/19 2:20 PM	--	--	--	--
Higgins 31-26TFH	33-025-03463	Pilot flame monitoring records incomplete	7/25/19 2:00 AM	7/25/19 8:00 AM	7/26/19 10:35 AM	8/1/19 11:59 PM	190.00	Combustion 114.58
			--	7/29/19 8:00 AM	--	--	--	--
Honaker USA 41-30TFH	33-053-08138	Pilot flame monitoring records incomplete	12/22/18 10:00 PM	12/22/18 11:45 PM	12/23/18 10:45 PM	1/13/19 6:00 AM	512.00	Combustion 296.75
			--	1/1/19 10:00 AM	1/3/19 10:00 AM	--	--	--

Appendix C – Well Completions with Hydraulic Fracturing									
Well/Facility Name	**API Number**	**Flare Monitoring Records Deviations.**	**Date and Time Flow back Onset**	**Date and Time of Flow back to Separator**	**Date and Time Returning to the Initial Flow back Stage**	**Date and Time Flow back Ended**	**Duration of Flow back**	**Duration and Disposition**	**Recovery/Combustion/ Venting**
			--	1/3/19 2:00 PM	1/4/19 12:10 PM	--	--	--	
			--	1/4/19 12:30 PM	1/5/19 7:35 AM	--	--	--	
			--	1/5/19 11:00 AM	1/5/19 5:30 PM	--	--	--	
			--	1/5/19 8:00 PM	--	--	--	--	
Howard USA 11-1H	33-061-01196	--	1/7/19 4:00 AM	1/26/19 11:00 AM	--	1/31/19 1:00 PM	585.00	Combustion 122.00	
Hurkes USA 41-16TFH	33-061-04227	--	6/2/19 7:00 AM	6/2/19 4:00 PM	6/3/19 6:00 PM	6/28/19 8:30 AM	625.50	Combustion 358.75	
			--	6/14/19 11:00 AM	6/18/19 7:00 AM	--	--	--	
			--	6/18/19 7:45 AM	--	--	--	--	
Irish USA 41-25TFH	33-053-08047	--	1/2/19 4:00 PM	1/2/19 5:00 PM	--	1/13/19 10:00 AM	258.00	Combustion 257.00	
Jackie USA 34-34TFH	33-061-03835	--	8/3/18 2:00 AM	8/3/18 7:00 AM	8/4/18 4:00 AM	8/13/18 12:00 AM	238.00	Combustion 149.00	
			--	8/7/18 3:00 PM	8/9/18 5:00 AM	--	--	--	
			--	8/9/18 6:00 AM	--	--	--	--	
Jerome USA 12-23TFH	33-053-07754	--	9/28/18 12:15 PM	9/28/18 1:00 PM	10/2/18 12:30 PM	11/5/18 11:00 PM	922.75	Combustion 916.00	

Appendix C – Well Completions with Hydraulic Fracturing									
Well/Facility Name	API Number	Flare Monitoring Records Deviations.	Date and Time Flow back Onset	Date and Time of Flow back to Separator	Date and Time Returning to the Initial Flow back Stage	Date and Time Flow back Ended	Duration of Flow back	Duration and Disposition	Recovery/Combustion/ Venting
			--	10/2/18 8:00 PM	10/7/18 10:20 PM	--	--	--	
			--	10/7/18 10:50 PM	--	--	--	--	
Joanne Quale USA 21-30H	33-053-03948	Pilot flame monitoring records incomplete	11/30/18 6:00 PM	11/30/18 7:00 PM	12/1/18 8:00 PM	1/2/19 12:00 PM	786.00	Combustion 290.00	
			--	12/22/18 11:00 AM	--	--	--	--	
Jocelyn 14-36TFH	33-025-03468	--	7/9/19 4:00 PM	7/15/19 2:00 PM	--	7/29/19 8:00 AM	472.00	Combustion 330.00	
Jones USA 14-14H	33-053-03258	Pilot flame monitoring records incomplete	10/1/18 9:00 PM	10/6/18 3:00 PM	--	10/11/18 6:00 AM	225.00	Combustion 111.00	
Joshua USA 13-23TFH-2B	33-053-07752	--	9/12/18 11:00 AM	9/12/18 11:01 AM	9/12/18 8:30 PM	9/23/18 5:00 AM	258.00	Combustion 257.48	
			--	9/12/18 9:00 PM	--	--	--	--	
Julia Jones USA 13-14TFH	33-053-08225	Pilot flame monitoring records incomplete	9/22/18 9:00 PM	9/22/18 9:01 PM	9/24/18 8:00 AM	12/12/18 12:00 AM	1923.0	Combustion 592.98	
			--	11/18/18 12:00 PM	11/28/18 6:00 AM	--	--	--	
			--	11/28/18 12:00 PM	--	--	--	--	
Kinney 24-36TFH	33-025-03469	--	7/8/19 5:00 AM	7/13/19 8:00 AM	7/17/19 1:00 AM	7/20/19 11:00 AM	294.00	Combustion 169.00	
			--	7/17/19 3:00 AM	--	--	--	--	

Appendix C – Well Completions with Hydraulic Fracturing									
Well/Facility Name	**API Number**	**Flare Monitoring Records Deviations.**	**Date and Time Flow back Onset**	**Date and Time of Flow back to Separator**	**Date and Time Returning to the Initial Flow back Stage**	**Date and Time Flow back Ended**	**Duration of Flow back**	**Duration and Disposition**	**Recovery/Combustion/ Venting**
Klaus 11-28H	33-025-03422	Pilot flame monitoring records incomplete	12/12/18 9:00 AM	12/12/18 10:30 AM	12/13/18 7:40 AM	12/28/18 10:00 AM	385.00	Sale 309.5/ Combustion 23.67	
			--	12/15/18 10:00 AM	--	--	--	--	
Lamarr USA 13-23TFH	33-053-07751	--	8/29/18 3:00 PM	8/29/18 3:01 PM	8/30/18 2:00 PM	9/10/18 10:00 PM	295.00	Combustion 291.98	
			--	8/30/18 5:00 PM	--	--	--	--	
Lars 14-8H	33-025-03446	--	8/13/18 6:00 PM	8/13/18 6:01 PM	--	8/25/18 12:00 PM	282.00	Combustion 281.98	
Lawrence 34-35H	33-025-03343	--	4/28/19 12:00 PM	5/10/19 1:00 PM	--	5/16/19 6:00 PM	438.00	Combustion 149.00	
Linton USA 31-16TFH	33-061-04226	--	5/31/19 5:00 PM	6/10/19 10:00 AM	6/11/19 7:15 AM	6/21/19 11:00 AM	498.00	264.00	
			--	6/11/19 8:15 AM	--	--	--	--	
Loftquist USA 34-34TFH	33-061-03965	--	7/27/18 10:00 AM	7/27/18 10:00 PM	7/28/18 2:30 PM	8/29/18 7:01 AM	789.02	Combustion 435.68	
			--	8/11/18 11:00 AM	8/13/18 5:20 PM	--	--	--	
			--	8/13/18 9:00 PM	8/17/18 9:30 AM	--	--	--	
			--	8/17/18 10:30 AM	8/17/18 3:11 PM	--	--	--	
			--	8/17/18 6:00 PM	8/20/18 10:30 PM	--	--	--	

Appendix C – Well Completions with Hydraulic Fracturing								
Well/Facility Name	**API Number**	**Flare Monitoring Records Deviations.**	**Date and Time Flow back Onset**	**Date and Time of Flow back to Separator**	**Date and Time Returning to the Initial Flow back Stage**	**Date and Time Flow back Ended**	**Duration of Flow back**	**Duration and Disposition Recovery/Combustion/ Venting**
			--	8/20/18 11:01 PM	8/26/18 11:15 AM	--	--	--
			--	8/26/18 12:05 PM	--	--	--	--
Lois USA 14-34H	33-061-04055	--	7/20/18 8:00 PM	7/20/18 11:00 PM	7/22/18 3:30 PM	8/8/18 5:00 AM	441.00	Combustion 336.50
			--	7/26/18 10:00 AM	7/27/18 9:30 AM	--	--	--
			--	7/27/18 2:30 PM	7/31/18 8:00 AM	--	--	--
			--	7/31/18 12:00 PM	8/3/18 3:00 PM	--	--	--
			--	8/3/18 5:00 PM	--	--	--	--
Loren USA 14-23TFH	33-053-07749	--	8/19/18 8:00 PM	8/20/18 12:00 AM	8/21/18 8:38 PM	9/5/18 4:45 AM	392.75	Combustion 344.02
			--	8/22/18 8:00 AM	8/22/18 12:33 PM	--	--	--
			--	8/22/18 2:06 PM	8/29/18 9:24 AM	--	--	--
			--	8/29/18 2:00 PM	8/30/18 1:15 PM	--	--	--
			--	8/30/18 3:55 PM	8/31/18 6:00 PM	--	--	--
			--	8/31/18 6:59 PM	9/2/18 1:19 PM	--	--	--
			--	9/3/18 10:00 AM	9/4/18 9:07 AM	--	--	--

Appendix C – Well Completions with Hydraulic Fracturing

Well/Facility Name	API Number	Flare Monitoring Records Deviations.	Date and Time Flow back Onset	Date and Time of Flow back to Separator	Date and Time Returning to the Initial Flow back Stage	Date and Time Flow back Ended	Duration of Flow back	Duration and Disposition Recovery/Combustion/ Venting
			--	9/4/18 12:00 PM	--	--	--	--
Lucas 34-35TFH	33-025-03359	--	4/12/19 1:00 PM	4/14/19 10:00 AM	--	4/24/19 12:00 PM	287.00	Combustion 242.00
Maleckar USA 31-30H	33-053-08133	Pilot flame monitoring records incomplete	12/14/18 1:00 AM	12/14/18 1:01 AM	12/15/18 10:00 AM	1/12/19 6:00 AM	701.00	Combustion 259.98
			--	1/2/19 5:00 PM	1/4/19 7:00 AM	--	--	--
			--	1/4/19 9:00 AM	--	--	--	--
Martha Grube USA 14-20H	33-061-04016	Pilot flame monitoring records incomplete	10/3/18 11:00 PM	10/3/18 11:01 PM	10/4/18 10:00 PM	11/20/18 6:00 AM	1135.00	Combustion 227.98
			--	11/11/18 3:00 PM	11/16/18 1:00 AM	--	--	--
			--	11/16/18 3:00 AM	--	--	--	--
Mason 14-31TFH	33-025-03582	--	6/20/19 11:00 PM	6/20/19 11:01 PM	6/21/19 7:00 PM	7/1/19 2:00 PM	255.00	Combustion 246.98
			--	6/22/19 3:00 AM	--	--	--	--
McCrory 44-35TFH	33-025-03560	--	4/6/19 7:00 PM	4/7/19 12:00 AM	4/7/19 10:00 PM	4/12/19 1:00 AM	126.00	Combustion 99.00
			--	4/8/19 8:00 PM	--	--	--	--
McDonald USA 44-19H	33-061-04121	Pilot flame monitoring records incomplete	9/1/18 12:00 AM	9/1/18 5:00 AM	9/2/18 4:38 AM	11/3/18 6:00 AM	1518.00	Combustion 303.63
			--	10/22/18 2:00 PM	--	--	--	--

Appendix C – Well Completions with Hydraulic Fracturing

Well/Facility Name	API Number	Flare Monitoring Records Deviations.	Date and Time Flow back Onset	Date and Time of Flow back to Separator	Date and Time Returning to the Initial Flow back Stage	Date and Time Flow back Ended	Duration of Flow back	Duration and Disposition Recovery/Combustion/ Venting
McKinley USA 24-7TFH	33-061-04173	--	3/10/19 7:00 AM	3/10/19 8:00 PM	3/11/19 4:30 AM	3/25/19 11:00 AM	364.00	Combustion 242.50
			--	3/15/19 5:00 PM	--	--	--	--
McMahon USA 14-34H	33-061-03832	--	8/8/18 5:00 PM	8/8/18 5:01 PM	8/13/18 7:50 PM	8/15/18 6:00 AM	157.00	Combustion 134.82
			--	8/14/18 6:00 PM	--	--	--	--
Meredith 14-24H	33-025-03727	Pilot flame monitoring records incomplete	7/15/19 5:00 PM	7/15/19 7:00 PM	7/16/19 3:30 PM	8/1/19 11:59 PM	415.00	Combustion 20.50
Michelle USA 14-14TFH	33-053-08158	--	10/27/18 11:00 PM	10/28/18 1:00 AM	10/29/18 12:00 AM	11/8/18 5:00 AM	270.00	Combustion 249.00
			--	10/29/18 12:00 PM	11/1/18 5:00 AM	--	--	--
			--	11/1/18 12:00 PM	--	--	--	--
Miriam USA 11-17H	33-061-04221	--	5/4/19 8:00 PM	5/6/19 10:00 AM	--	5/18/19 10:00 AM	326.00	Combustion 288.00
Monteau USA 34-7H	33-061-04174	--	3/8/19 12:00 PM	3/10/19 11:00 AM	--	3/18/19 12:00 PM	240.00	Combustion 193.00
Ness USA 31-17H	33-061-03837	Pilot flame monitoring records incomplete	10/17/18 11:00 AM	10/17/18 11:01 AM	10/18/18 11:30 AM	10/27/18 6:00 AM	235.00	Combustion 210.48
			--	10/19/18 12:00 PM	--	--	--	--
Nora Jones USA 12-14TFH-2B	33-053-08223	--	10/1/18 2:00 AM	10/1/18 2:01 AM	10/2/18 10:00 PM	11/6/18 6:00 AM	868.00	Combustion 338.98

Appendix C – Well Completions with Hydraulic Fracturing								
Well/Facility Name	API Number	Flare Monitoring Records Deviations.	Date and Time Flow back Onset	Date and Time of Flow back to Separator	Date and Time Returning to the Initial Flow back Stage	Date and Time Flow back Ended	Duration of Flow back	Duration and Disposition Recovery/Combustion/ Venting
			--	10/23/18 2:00 PM	10/24/18 4:00 PM	--	--	--
			--	10/24/18 7:00 PM	10/25/18 9:00 AM	--	--	--
			--	10/26/18 2:00 PM	10/26/18 10:00 PM	--	--	--
			--	10/26/18 11:00 PM	--	--	--	--
Northrop 34-16H	33-025-03453	--	10/31/18 7:00 AM	10/31/18 9:00 AM	11/1/18 10:00 AM	11/7/18 8:00 AM	169.00	Combustion 167.00
			--	11/7/18 10:00 AM	--	--	--	--
Nugget USA 14-20TFH	33-061-04017	Pilot flame monitoring records incomplete	10/6/18 8:00 PM	10/7/18 1:00 AM	10/7/18 11:00 PM	11/11/18 5:00 AM	849.00	Combustion 205.00
			--	11/3/18 2:00 PM	--	--	--	--
Oren USA 31-6TFH	33-061-01624	--	2/24/19 4:00 PM	2/26/19 12:00 PM	--	3/6/19 2:00 PM	238.00	Combustion 194.00
Otis 11-28TFH	33-025-03423	Pilot flame monitoring records incomplete	12/8/18 10:00 PM	12/9/18 2:00 AM	12/10/18 6:00 PM	1/1/19 6:00 AM	560.00	Combustion 391.00
			--	12/17/18 3:00 PM	--	--	--	--
Phyllis USA 11-23H	33-053-08159	--	11/11/18 1:00 PM	11/11/18 1:01 PM	--	11/21/18 1:00 AM	228.00	Combustion 227.98
Rafter X 44-35H	33-025-03356	Pilot flame monitoring records incomplete	3/24/19 8:00 AM	3/24/19 7:00 PM	3/25/19 2:00 PM	4/6/19 6:00 AM	310.00	Combustion 152.00

Appendix C – Well Completions with Hydraulic Fracturing								
Well/Facility Name	**API Number**	**Flare Monitoring Records Deviations.**	**Date and Time Flow back Onset**	**Date and Time of Flow back to Separator**	**Date and Time Returning to the Initial Flow back Stage**	**Date and Time Flow back Ended**	**Duration of Flow back**	**Duration and Disposition Recovery/Combustion/ Venting**
			--	3/31/19 5:00 PM	--	--	--	--
Ranger USA 24-34TFH	33-061-03833	--	7/19/18 1:00 AM	7/19/18 4:00 AM	7/20/18 6:00 AM	8/7/18 6:00 AM	461.00	Combustion 391.62
			--	7/22/18 9:00 AM	7/27/18 9:20 AM	--	--	--
			--	7/27/18 4:00 PM	8/3/18 4:31 AM	--	--	--
			--	8/3/18 10:00 AM	8/4/18 5:57 AM	--	--	--
			--	8/4/18 6:30 AM	8/5/18 8:19 AM	--	--	--
			--	8/5/18 11:00 AM	--	--	--	--
Red Feather USA 21-17H	33-061-01613	--	4/26/19 5:00 PM	4/26/19 6:00 PM	5/2/19 4:00 PM	5/11/19 11:00 AM	354.00	Combustion 310.00
			--	5/4/19 11:00 AM	--	--	--	--
Red Feather USA 31-17H	33-061-01612	--	5/3/19 10:00 AM	5/3/19 10:01 AM	--	5/14/19 10:00 AM	264.00	Combustion 263.98
Reyes USA 21-16H	33-061-04261	--	5/31/19 10:00 AM	5/31/19 10:01 AM	--	6/11/19 6:00 AM	260.00	Combustion 259.98
Rochelle USA 21-17TFH	33-061-04222	--	5/5/19 8:00 PM	5/5/19 8:03 PM	5/6/19 12:00 AM	5/21/19 8:45 AM	372.75	Combustion 313.20
			--	5/6/19 3:00 PM	5/6/19 7:30 PM	--	--	--
			--	5/8/19 4:00 PM		--	--	--

Appendix C – Well Completions with Hydraulic Fracturing								
Well/Facility Name	**API Number**	**Flare Monitoring Records Deviations.**	**Date and Time Flow back Onset**	**Date and Time of Flow back to Separator**	**Date and Time Returning to the Initial Flow back Stage**	**Date and Time Flow back Ended**	**Duration of Flow back**	**Duration and Disposition Recovery/Combustion/ Venting**
Rue USA 44-19TFH	33-061-04120	Pilot flame monitoring records incomplete	9/13/18 5:00 AM	9/13/18 5:01 AM	9/14/18 1:37 PM	10/22/18 6:00 AM	937.00	Combustion 335.60
			--	10/9/18 12:00 PM	10/12/18 2:00 PM	--	--	--
			--	10/12/18 5:00 PM		--	--	--
Rummel 24-35TFH	33-025-03342	--	5/4/19 12:00 PM	5/4/19 1:00 PM	--	5/15/19 9:00 AM	261.00	Combustion 260.00
Ruth 44-23TFH	33-025-03465	--	7/31/19 7:00 PM	7/31/19 7:00 PM	--	8/1/19 11:59 PM	29.00	Combustion 29.00
Sears USA 21-16TFH	33-061-04260	--	6/2/19 11:00 AM	6/2/19 12:00 PM	--	6/13/19 6:00 AM	259.00	Combustion 258.00
Sheldon USA 21-30TFH	33-053-08414	Pilot flame monitoring records incomplete	12/2/18 12:00 PM	12/2/18 2:25 PM	12/3/18 1:00 PM	1/7/19 6:00 AM	858.00	Combustion 162.58
			--	1/1/18 10:00 AM	--	--	--	--
Sibyl USA 44-19TFH	33-061-04122	Pilot flame monitoring records incomplete	9/2/18 12:00 PM	9/2/18 2:00 PM	9/3/18 1:00 PM	10/2/18 5:01 PM	725.02	Combustion 210.77
			--	9/21/18 5:15 PM	9/23/18 2:00 PM	--	--	--
			--	9/26/18 10:00 AM	9/28/18 11:00 AM	--	--	--
			--	9/28/18 12:00 PM	9/28/18 2:00 PM	--	--	--
			--	9/28/18 3:00 PM	9/29/18 1:00 PM	--	--	--
			--	9/29/18 3:00 PM	10/1/18 3:00 PM	--	--	--

Appendix C – Well Completions with Hydraulic Fracturing								
Well/Facility Name	**API Number**	**Flare Monitoring Records Deviations.**	**Date and Time Flow back Onset**	**Date and Time of Flow back to Separator**	**Date and Time Returning to the Initial Flow back Stage**	**Date and Time Flow back Ended**	**Duration of Flow back**	**Duration and Disposition Recovery/Combustion/ Venting**
			--	10/1/18 7:00 PM	--	--	--	--
Skadeland USA 31-30TFH	33-053-08134	Pilot flame monitoring records incomplete	12/16/18 10:00 AM	12/16/18 1:00 PM	12/17/18 8:00 AM	1/17/19 7:00 AM	765.00	Combustion 248.57
			--	1/7/19 3:00 PM	1/9/19 3:34 AM	--	--	--
			--	1/9/19 6:00 AM	--	--	--	--
Snider 41-26TFH	33-025-03464	--	7/26/19 10:00 AM	7/26/19 12:00 PM	--	7/31/19 1:00 PM	123.00	Combustion 121.00
Snowman USA 41-25H	33-053-08048	--	12/24/18 9:00 AM	12/24/18 9:01 AM	--	1/9/19 5:00 AM	380.00	Combustion 379.98
State Eggert 24-36H	33-025-03537	--	7/9/19 1:00 PM	7/9/19 1:01 PM	--	7/18/19 7:30 AM	210.50	Combustion 210.48
State Eileen 34-36TFH	33-025-03538	--	7/5/19 1:00 PM	7/5/19 1:01 PM	--	7/16/19 12:30 PM	263.50	Combustion 263.48
State Elias 34-36TFH	33-025-03539	--	6/30/19 8:00 AM	6/30/19 8:01 AM	--	7/9/19 9:00 AM	217.00	Combustion 216.98
State Etta 44-36H	33-025-03540	--	6/24/19 4:00 PM	6/26/19 8:00 AM	--	7/5/19 9:01 AM	257.02	Combustion 217.02
State Kelling 14-36TFH	33-025-03360	--	4/2/19 10:00 PM	4/3/19 3:00 AM	4/4/19 5:15 AM	4/17/19 8:50 AM	346.83	Combustion 212.08
			--	4/9/19 3:00 PM	--	--	--	--
State Kreiger 14-36H	33-025-03361	--	4/4/19 2:00 PM	4/4/19 11:00 PM	4/5/19 6:00 PM	4/16/19 10:00 AM	284.00	Combustion 260.00
			--	4/6/19 9:00 AM	--	--	--	--

Appendix C – Well Completions with Hydraulic Fracturing									
Well/Facility Name	**API Number**	**Flare Monitoring Records Deviations.**	**Date and Time Flow back Onset**	**Date and Time of Flow back to Separator**	**Date and Time Returning to the Initial Flow back Stage**	**Date and Time Flow back Ended**	**Duration of Flow back**	**Duration and Disposition**	**Recovery/Combustion/ Venting**
State Oster 14-36TFH	33-025-03362	--	4/1/19 7:00 AM	4/1/19 7:01 AM	4/2/19 1:20 PM	4/9/19 10:00 AM	195.00		Combustion 177.32
			--	4/3/19 7:00 AM	--	--	--		--
TAT USA 12-23H	33-053-03677	--	10/23/18 8:00 PM	10/24/18 6:00 AM	10/25/18 1:00 AM	11/14/18 4:00 AM	512.00		Combustion 149.00
			--	11/8/18 4:00 PM	11/8/18 5:00 PM	--	--		--
			--	11/8/18 7:00 PM	--	--	--		--
Tony USA 24-34H	33-061-03834	--	8/4/18 12:00 PM	8/4/18 12:01 PM	8/5/18 1:00 PM	8/22/18 5:00 AM	425.00		Combustion 157.48
			--	8/16/18 1:00 PM	8/20/18 11:30 PM	--	--		--
			--	8/21/18 3:00 AM	--	--	--		--
Turkey Feet USA 41-17TFH	33-061-04225	--	5/10/19 2:00 AM	5/10/19 4:00 PM	5/11/19 1:00 AM	6/4/19 1:00 AM	599.00		Combustion 267.08
			--	5/22/19 10:00 AM	5/25/19 3:10 PM	--	--		--
			--	5/26/19 3:00 AM	5/26/19 10:55 AM	--	--		--
			--	5/27/19 5:00 PM	5/31/19 7:00 AM	--	--		--
			--	5/31/19 10:00 AM	--	--	--		--
Two Bar 34-35H	33-025-03358	--	4/11/19 8:00 AM	4/18/19 8:00 PM	--	4/23/19 8:35 AM	288.58		Combustion 108.58

Appendix C – Well Completions with Hydraulic Fracturing									
Well/Facility Name	**API Number**	**Flare Monitoring Records Deviations.**	**Date and Time Flow back Onset**	**Date and Time of Flow back to Separator**	**Date and Time Returning to the Initial Flow back Stage**	**Date and Time Flow back Ended**	**Duration of Flow back**	**Duration and Disposition**	**Recovery/Combustion/ Venting**
Veddy 44-16H	33-025-03454	--	10/9/18 5:00 PM	10/12/18 8:00 PM	10/13/18 7:30 PM	10/21/18 4:30 AM	275.50	Combustion 194.00	
			--	10/14/18 2:00 AM	--	--	--	--	
Walking Eagle USA 44-12TFH	33-061-04151	--	2/2/19 5:00 AM	2/2/19 12:00 PM	2/3/19 5:26 AM	2/16/19 11:00 AM	342.00	Combustion 231.93	
			--	2/7/19 12:00 PM	2/14/19 4:15 PM	--	--	--	
			--	2/14/19 4:45 PM	--	--	--	--	
Weidman USA 11-15TFH	33-061-04229	--	6/5/19 2:00 PM	6/5/19 7:00 PM	6/7/19 2:00 AM	7/1/19 8:45 AM	618.75	Combustion 94.75	
			--	6/28/19 5:00 PM	--	--	--	--	
Wendell USA 31-30H	33-053-08135	Pilot flame monitoring records incomplete	12/17/18 3:30 PM	12/17/18 4:00 PM	12/18/18 5:30 PM	1/23/19 5:00 AM	877.50	Combustion 275.00	
			--	1/12/19 3:00 PM	1/12/19 7:45 PM	--	--	--	
			--	1/12/19 8:20 PM	1/13/19 3:10 AM	--	--	--	
			--	1/13/19 6:00 AM	1/13/19 9:15 AM	--	--	--	
			--	1/13/19 9:20 AM	1/18/19 2:00 AM	--	--	--	
			--	1/18/19 3:00 AM	--	--	--	--	
Weninger USA 44-34H	33-061-01374	--	7/25/18 3:00 PM	7/25/18 4:00 PM	7/26/18 3:03 PM	8/10/18 10:00 AM	379.00	Combustion 250.05	

Appendix C – Well Completions with Hydraulic Fracturing

Well/Facility Name	API Number	Flare Monitoring Records Deviations.	Date and Time Flow back Onset	Date and Time of Flow back to Separator	Date and Time Returning to the Initial Flow back Stage	Date and Time Flow back Ended	Duration of Flow back	Duration and Disposition Recovery/Combustion/ Venting
			--	7/26/18 11:00 AM	7/27/18 4:00 AM	--	--	--
			--	8/1/18 4:00 PM	--	--	--	--
White Owl USA 41-16H	33-061-04228	--	6/4/19 5:00 AM	6/22/19 2:00 PM	--	7/2/19 1:00 AM	668.00	Combustion 227.00
Whitebody USA 14-23H	33-053-07750	--	8/24/18 9:30 AM	8/24/18 10:00 AM	8/24/18 11:45 AM	9/7/18 1:00 AM	327.50	Combustion 273.77
			--	8/24/18 11:59 AM	8/29/18 10:00 AM	--	--	--
			--	8/29/18 2:00 PM	8/30/18 2:00 PM	--	--	--
			--	8/30/18 5:00 PM	9/2/18 2:00 PM	--	--	--
			--	9/4/18 12:00 PM	--	--	--	--
Wickett 24-35TFH	33-025-03340	--	4/23/19 2:00 PM	4/24/19 6:00 AM	4/24/19 6:00 PM	5/4/19 8:15 AM	258.25	Combustion 227.25
			--	4/25/19 9:00 AM	--	--	--	--
Wilkinson USA 11-1H	33-061-04062	--	1/25/19 4:00 PM	1/25/19 4:01 PM	1/25/19 8:50 PM	2/4/19 1:00 AM	225.00	Combustion 222.82
			--	1/25/19 11:00 PM	--	--	--	--
Yellow Otter USA 14-7TFH	33-061-04153	--	1/31/19 8:00 AM	2/1/19 11:00 AM	2/1/19 3:50 PM	2/28/19 1:00 PM	677.00	Combustion 263.83
			--	2/17/19 6:00 PM	--	--	--	--

Appendix C – Well Completions with Hydraulic Fracturing									
Well/Facility Name	**API Number**	**Flare Monitoring Records Deviations.**	**Date and Time Flow back Onset**	**Date and Time of Flow back to Separator**	**Date and Time Returning to the Initial Flow back Stage**	**Date and Time Flow back Ended**	**Duration of Flow back**	**Duration and Disposition**	**Recovery/Combustion/ Venting**
Yellowface USA 13-23H	33-053-08368	--	9/9/18 5:00 PM	9/9/18 5:01 PM	9/10/18 3:54 PM	9/28/18 6:00 AM	445.00	Combustion 433.30	
			--	9/10/18 7:00 PM	9/11/18 9:00 PM	--	--	--	
			--	9/11/18 9:15 PM	9/12/18 12:45 AM	--	--	--	
			--	9/12/18 1:45 AM	9/12/18 10:39 PM	--	--	--	
			--	9/12/18 10:59 PM	9/14/18 8:00 AM	--	--	--	
			--	9/14/18 3:00 PM	--	--	--	--	
Young Woman USA 44-12H	33-061-04152	--	1/27/19 4:00 PM	1/28/19 5:00 AM	1/29/19 1:00 AM	2/22/19 9:05 AM	617.08	Combustion 418.00	
			--	1/29/19 3:00 PM	1/30/19 8:20 PM	--	--	--	
			--	2/5/19 2:00 PM	2/16/19 11:30 AM	--	--	--	
			--	2/17/19 4:00 PM	2/20/19 3:05 AM	--	--	--	
			--	2/20/19 9:00 AM	--	--	--	--	
Zelda USA 11-29H	33-053-08137	Pilot flame monitoring records incomplete	12/24/18 10:00 AM	12/24/18 10:01 AM	12/25/18 10:00 AM	1/22/19 6:00 AM	692.00	Combustion 231.98	
			--	1/13/19 2:00 PM	--	--	--	--	

Appendix D – Storage Vessel Affected Facilities

Appendix D – Storage Vessel Affected Facilities		
Well/Facility Name	**Latitude**	**Longitude**
Annie USA Pad (Zelda CTB)	(b) (9) [redacted]	(b) (9) [redacted]
Appledoorn 14-19H	[redacted]	[redacted]
Arthur Pad	[redacted]	[redacted]
Axell USA Pad	[redacted]	[redacted]
Baker USA Pad	[redacted]	[redacted]
Bear Den Pad	[redacted]	[redacted]
Beck Pad CTB	[redacted]	[redacted]
Big Head Pad (Stark CTB)	[redacted]	[redacted]
Bill Connolly Pad	[redacted]	[redacted]
Bingo Pad	[redacted]	[redacted]
Burshia USA Pad	[redacted]	[redacted]
Chapman CTB	[redacted]	[redacted]
Chimney Butte	[redacted]	[redacted]
Christensen 34-33H	[redacted]	[redacted]
Clara USA Pad	[redacted]	[redacted]
Clarks Creek USA Pad	[redacted]	[redacted]
Connie Connolly Pad	[redacted]	[redacted]
Connolly 31 pad(Hugo CTB)	[redacted]	[redacted]
Darcy Pad	[redacted]	[redacted]
Debbie Baklenko USA Pad	[redacted]	[redacted]
Delia USA Pad	[redacted]	[redacted]
Eagle USA Pad	[redacted]	[redacted]
Earl Pennington USA Pad (Kattevold CTB)	[redacted]	[redacted]
Fred Hansen 34-8H	[redacted]	[redacted]
Galen Fox USA Pad	[redacted]	[redacted]
Gloria Pad	[redacted]	[redacted]
Goldberg USA Pad	[redacted]	[redacted]
Grady USA Pad	[redacted]	[redacted]
Gravel Coulee Pad	[redacted]	[redacted]
Howard USA Pad	[redacted]	[redacted]
Hunts Along USA Pad	[redacted]	[redacted]
Irish USA Pad	[redacted]	[redacted]
Joanne Quale USA Pad	[redacted]	[redacted]
Jones USA Pad	[redacted]	[redacted]
Kempf Trust 21-14H	[redacted]	[redacted]
Kent Carlson 14 Pad	[redacted]	[redacted]
Kermit USA Pad	[redacted]	[redacted]
Kevin Buehner 31 Pad (Bethol CTB)	[redacted]	[redacted]
Ladonna Klatt CTB	[redacted]	[redacted]
Lars Pad	[redacted]	[redacted]

Appendix D – Storage Vessel Affected Facilities		
Well/Facility Name	**Latitude**	**Longitude**
Luther-Weidman USA CTB Pad	(b) (9) [redacted]	(b) (9) [redacted]
Marlin 14 Pad	[redacted]	[redacted]
Felix USA Pad (Martinez USA)	[redacted]	[redacted]
Mary Hansen 14-9H	[redacted]	[redacted]
Mason Pad	[redacted]	[redacted]
Mikkelsen Pad	[redacted]	[redacted]
Moline Pad	[redacted]	[redacted]
Ness USA Pad	[redacted]	[redacted]
Oneil 24-24H	[redacted]	[redacted]
Oneil 34-24H	[redacted]	[redacted]
Oscar Stohler 41-4H	[redacted]	[redacted]
Pelton 24-31H	[redacted]	[redacted]
Quill 34-11H	[redacted]	[redacted]
Ranger USA Pad	[redacted]	[redacted]
Raymond USA Pad	[redacted]	[redacted]
Red Feather USA Pad	[redacted]	[redacted]
Repp 34-34H	[redacted]	[redacted]
Ringer Pad	[redacted]	[redacted]
Rosa Benz Pad	[redacted]	[redacted]
Sherman USA Pad	[redacted]	[redacted]
Shobe Pad	[redacted]	[redacted]
State Eggert Pad	[redacted]	[redacted]
State Kreiger Pad	[redacted]	[redacted]
Stohler 41 CTB	[redacted]	[redacted]
TAT USA 13 Pad	[redacted]	[redacted]
TAT USA 34 Pad	[redacted]	[redacted]
Tescher 11-27H	[redacted]	[redacted]
Trotter 14-23H	[redacted]	[redacted]
Two Bar Pad	[redacted]	[redacted]
Veronica USA Pad	[redacted]	[redacted]
Voigt 11-15H	[redacted]	[redacted]
William Kukla CTB	[redacted]	[redacted]
Yellow Otter USA pad	[redacted]	[redacted]

Appendix E- Storage Vessel Affected Facility VOC Emission Rate Determinations

Completion Name	Field	Date	Down Time Hours	Actual Oil Production
Arthur CTB	Bailey	5/18/2019	0	2222.99
Arthur CTB	Bailey	5/19/2019	0	2811.38
Arthur CTB	Bailey	5/20/2019	0	3182.92
Arthur CTB	Bailey	5/21/2019	0	2857.67
Arthur CTB	Bailey	5/22/2019	0	2774.99
Arthur CTB	Bailey	5/23/2019	0	2478.09
Arthur CTB	Bailey	5/24/2019	0	2268.58
Arthur CTB	Bailey	5/25/2019	0	2416.01
Arthur CTB	Bailey	5/26/2019	0	2859.58
Arthur CTB	Bailey	5/27/2019	0	3163.40
Arthur CTB	Bailey	5/28/2019	0	2810.77
Arthur CTB	Bailey	5/29/2019	0	3507.71
Arthur CTB	Bailey	5/30/2019	0	3876.53
Arthur CTB	Bailey	5/31/2019	0	4621.77
Arthur CTB	Bailey	6/1/2019	0	4838.41
Arthur CTB	Bailey	6/2/2019	0	4754.09
Arthur CTB	Bailey	6/3/2019	0	4704.61
Arthur CTB	Bailey	6/4/2019	0	4633.45
Arthur CTB	Bailey	6/5/2019	0	4619.46
Arthur CTB	Bailey	6/6/2019	0	4555.64
Arthur CTB	Bailey	6/7/2019	0	4500.97
Arthur CTB	Bailey	6/8/2019	0	4475.90
Arthur CTB	Bailey	6/9/2019	0	4401.56
Arthur CTB	Bailey	6/10/2019	0	4316.51
Arthur CTB	Bailey	6/11/2019	0	3368.07
Arthur CTB	Bailey	6/12/2019	0	4118.50
Arthur CTB	Bailey	6/13/2019	0	4259.33
Arthur CTB	Bailey	6/14/2019	0	4195.41
Arthur CTB	Bailey	6/15/2019	0	4079.27
Arthur CTB	Bailey	6/16/2019	0	4093.04
	Average 5/18/2019 through 6/16/2019			3725.55

NSPS OOOOa Applicability Determination for Storage tanks

Arthur CTB	Facility Name
3725.55	Average of first thirty days of production
5/18/2019	Date of first production
7	Number of oil tanks
0.6	Decline factor
16.83	Storage tank emissions - total
44084-44090	Tank numbers
44085, 44086, 44088	LACT permissive tank

Facility Name	Field	Date	Down Time Hours	Actual Oil Production
Axell USA CTB	Reunion Bay	11/4/2018	0	8889.09
Axell USA CTB	Reunion Bay	11/5/2018	0	9700.52
Axell USA CTB	Reunion Bay	11/6/2018	0	8509.01
Axell USA CTB	Reunion Bay	11/7/2018	0	7175.94
Axell USA CTB	Reunion Bay	11/8/2018	0	7646.48
Axell USA CTB	Reunion Bay	11/9/2018	0	7297.14
Axell USA CTB	Reunion Bay	11/10/2018	0	6851.93
Axell USA CTB	Reunion Bay	11/11/2018	0	5967.10
Axell USA CTB	Reunion Bay	11/12/2018	0	6543.44
Axell USA CTB	Reunion Bay	11/13/2018	0	6223.68
Axell USA CTB	Reunion Bay	11/14/2018	0	5983.12
Axell USA CTB	Reunion Bay	11/15/2018	0	5329.59
Axell USA CTB	Reunion Bay	11/16/2018	0	5557.91
Axell USA CTB	Reunion Bay	11/17/2018	0	4164.51
Axell USA CTB	Reunion Bay	11/18/2018	0	4486.95
Axell USA CTB	Reunion Bay	11/19/2018	0	4880.64
Axell USA CTB	Reunion Bay	11/20/2018	0	4363.78
Axell USA CTB	Reunion Bay	11/21/2018	0	3415.96
Axell USA CTB	Reunion Bay	11/22/2018	0	6697.47
Axell USA CTB	Reunion Bay	11/23/2018	0	7330.26
Axell USA CTB	Reunion Bay	11/24/2018	0	6137.92
Axell USA CTB	Reunion Bay	11/25/2018	0	5164.11
Axell USA CTB	Reunion Bay	11/26/2018	0	7030.55
Axell USA CTB	Reunion Bay	11/27/2018	0	6911.44
Axell USA CTB	Reunion Bay	11/28/2018	0	3193.70
Axell USA CTB	Reunion Bay	11/29/2018	0	4256.15
Axell USA CTB	Reunion Bay	11/30/2018	0	5109.61
Axell USA CTB	Reunion Bay	12/1/2018	0	1104.05
Axell USA CTB	Reunion Bay	12/2/2018	0	4422.06
Axell USA CTB	Reunion Bay	12/3/2018	0	5646.26
	Average 3/7/2019 through 4/18/2019			5866.35

NSPS OOOOa Applicability Determination for Storage tanks

Axell USA CTB	Facility Name
5866.35	Average of first thirty days of production
11/4/2018	Date of first production
9	Number of oil tanks
0.5	Decline factor
21.30	Storage tank emissions - total
2917-2922, 2923-2925	Tank numbers
2918, 2919, 2922, 2924	LACT permissive tanks

Completion Name	Field	Date	Down Time Hours	Actual Oil Production
Baker USA CTB	Reunion Bay	3/21/2019	0	5035.75
Baker USA CTB	Reunion Bay	3/22/2019	0	5035.77
Baker USA CTB	Reunion Bay	3/23/2019	0	4933.14
Baker USA CTB	Reunion Bay	3/24/2019	0	4435.94
Baker USA CTB	Reunion Bay	3/25/2019	0	4454.18
Baker USA CTB	Reunion Bay	3/26/2019	0	4263.66
Baker USA CTB	Reunion Bay	3/27/2019	0	4284.19
Baker USA CTB	Reunion Bay	3/28/2019	0	4164.70
Baker USA CTB	Reunion Bay	3/29/2019	0	4005.30
Baker USA CTB	Reunion Bay	3/30/2019	0	3996.34
Baker USA CTB	Reunion Bay	3/31/2019	0	4057.74
Baker USA CTB	Reunion Bay	4/1/2019	0	3726.35
Baker USA CTB	Reunion Bay	4/2/2019	0	3826.25
Baker USA CTB	Reunion Bay	4/3/2019	0	3422.54
Baker USA CTB	Reunion Bay	4/4/2019	0	3325.58
Baker USA CTB	Reunion Bay	4/5/2019	0	2665.12
Baker USA CTB	Reunion Bay	4/6/2019	0	1891.97
Baker USA CTB	Reunion Bay	4/7/2019	0	1932.32
Baker USA CTB	Reunion Bay	4/8/2019	0	2467.34
Baker USA CTB	Reunion Bay	4/9/2019	0	2438.74
Baker USA CTB	Reunion Bay	4/10/2019	0	2188.04
Baker USA CTB	Reunion Bay	4/11/2019	0	2948.89
Baker USA CTB	Reunion Bay	4/12/2019	0	4863.13
Baker USA CTB	Reunion Bay	4/13/2019	0	5536.03
Baker USA CTB	Reunion Bay	4/14/2019	0	5576.13
Baker USA CTB	Reunion Bay	4/15/2019	0	5416.93
Baker USA CTB	Reunion Bay	4/16/2019	0	5427.84
Baker USA CTB	Reunion Bay	4/17/2019	0	5274.12
Baker USA CTB	Reunion Bay	4/18/2019	0	5066.71
Baker USA CTB	Reunion Bay	4/19/2019	0	5313.19
	Average			4065.80

NSPS OOOOa Applicability Determination for Storage tanks

Baker USA CTB	Facility Name
4065.80	Average of first thirty days of production
3/21/2019	Date of first production
6	Number of oil tanks
0.5	Decline factor
18.33	Storage tank emissions - total
3005-3010	Tank numbers
3006, 3007, 3008, 3009	LACT permissive tank

Completion Name	Field	Date	Down Time Hours(1)	Actual Oil Production
Bluegrass CTB	Bailey	4/10/2018	0	1280.76
Bluegrass CTB	Bailey	4/11/2018	0	994.72
Bluegrass CTB	Bailey	4/12/2018	0	989.75
Bluegrass CTB	Bailey	4/13/2018	0	889.21
Bluegrass CTB	Bailey	4/14/2018	0	948.07
Bluegrass CTB	Bailey	4/15/2018	0	915.33
Bluegrass CTB	Bailey	4/16/2018	0	902.08
Bluegrass CTB	Bailey	4/17/2018	0	887.34
Bluegrass CTB	Bailey	4/18/2018	0	865.89
Bluegrass CTB	Bailey	4/19/2018	0	861.46
Bluegrass CTB	Bailey	4/20/2018	0	868.66
Bluegrass CTB	Bailey	4/21/2018	0	781.01
Bluegrass CTB	Bailey	4/22/2018	0	770.46
Bluegrass CTB	Bailey	4/23/2018	0	856.14
Bluegrass CTB	Bailey	4/24/2018	0	1000.69
Bluegrass CTB	Bailey	4/25/2018	0	1033.73
Bluegrass CTB	Bailey	4/26/2018	0	848.55
Bluegrass CTB	Bailey	4/27/2018	0	149.17
Bluegrass CTB	Bailey	4/28/2018	0	148.53
Bluegrass CTB	Bailey	4/29/2018	0	168.38
Bluegrass CTB	Bailey	4/30/2018	0	145.87
Bluegrass CTB	Bailey	5/1/2018	0	474.30
Bluegrass CTB	Bailey	5/2/2018	0	837.16
Bluegrass CTB	Bailey	5/3/2018	0	1041.13
Bluegrass CTB	Bailey	5/4/2018	0	846.75
Bluegrass CTB	Bailey	5/5/2018	0	1005.62
Bluegrass CTB	Bailey	5/6/2018	0	1037.45
Bluegrass CTB	Bailey	5/7/2018	0	929.43
Bluegrass CTB	Bailey	5/8/2018	0	935.42
Bluegrass CTB	Bailey	5/9/2018	0	1052.90
	Average 8/27/2018 through 9/25/2018			815.53

NSPS OOOOa Applicability Determination for Storage tanks

Bluegrass CTB	Facility Name
815.53	Average of first thirty days of production
4/10/2018	Date of first production
9	Number of oil tanks
	Date of LACT unit installation
1	Decline factor
15.39	Storage tank emissions - total
42301-42310, 43041-43042	Tank numbers
42305	LACT permissive tank

Completion Name	Field	Date	Down Time Hours	Actual Oil Production
Burshia USA CTB	Reunion Bay	4/1/2019	0	3284.26
Burshia USA CTB	Reunion Bay	4/2/2019	0	3700.78
Burshia USA CTB	Reunion Bay	4/3/2019	0	2228.44
Burshia USA CTB	Reunion Bay	4/4/2019	0	2443.38
Burshia USA CTB	Reunion Bay	4/5/2019	0	3025.70
Burshia USA CTB	Reunion Bay	4/6/2019	0	3603.03
Burshia USA CTB	Reunion Bay	4/7/2019	0	4937.49
Burshia USA CTB	Reunion Bay	4/8/2019	0	4373.23
Burshia USA CTB	Reunion Bay	4/9/2019	0	3579.09
Burshia USA CTB	Reunion Bay	4/10/2019	0	3306.50
Burshia USA CTB	Reunion Bay	4/11/2019	0	3708.26
Burshia USA CTB	Reunion Bay	4/12/2019	0	4004.19
Burshia USA CTB	Reunion Bay	4/13/2019	0	3741.19
Burshia USA CTB	Reunion Bay	4/14/2019	0	3619.47
Burshia USA CTB	Reunion Bay	4/15/2019	0	3612.65
Burshia USA CTB	Reunion Bay	4/16/2019	0	3554.91
Burshia USA CTB	Reunion Bay	4/17/2019	0	3747.63
Burshia USA CTB	Reunion Bay	4/18/2019	0	3719.75
Burshia USA CTB	Reunion Bay	4/19/2019	0	3569.75
Burshia USA CTB	Reunion Bay	4/20/2019	0	3733.89
Burshia USA CTB	Reunion Bay	4/21/2019	0	3869.71
Burshia USA CTB	Reunion Bay	4/22/2019	0	4890.84
Burshia USA CTB	Reunion Bay	4/23/2019	0	4815.57
Burshia USA CTB	Reunion Bay	4/24/2019	0	3943.22
Burshia USA CTB	Reunion Bay	4/25/2019	0	3962.80
Burshia USA CTB	Reunion Bay	4/26/2019	0	3825.76
Burshia USA CTB	Reunion Bay	4/27/2019	0	4180.55
Burshia USA CTB	Reunion Bay	4/28/2019	0	3815.44
Burshia USA CTB	Reunion Bay	4/29/2019	0	4337.44
Burshia USA CTB	Reunion Bay	4/30/2019	0	4234.20
	Average			3778.97

NSPS OOOOa Applicability Determination for Storage tanks

Burshia USA CTB	Facility Name
3778.97	Average of first thirty days of production
4/1/2019	Date of first production
6	Number of oil tanks
	Date of LACT unit installation
0.5	Decline factor
17.03	Storage tank emissions - total
2999-3004	Tank numbers
3000, 3001, 3003	LACT permissive tank

Facility Name	Field	Date	Down Time Hours	Actual Oil Production
Clara USA CTB	Reunion Bay	11/21/2019	0	7451.034219
Clara USA CTB	Reunion Bay	11/22/2019	0	9871.495691
Clara USA CTB	Reunion Bay	11/23/2019	0	9704.528789
Clara USA CTB	Reunion Bay	11/24/2019	0	9203.496698
Clara USA CTB	Reunion Bay	11/25/2019	0	8664.781895
Clara USA CTB	Reunion Bay	11/26/2019	0	8220.194832
Clara USA CTB	Reunion Bay	11/27/2019	0	7845.590346
Clara USA CTB	Reunion Bay	11/28/2019	0	3335.162769
Clara USA CTB	Reunion Bay	11/29/2019	0	2058.485241
Clara USA CTB	Reunion Bay	11/30/2019	0	1767.362405
Clara USA CTB	Reunion Bay	12/1/2019	0	1727.418826
Clara USA CTB	Reunion Bay	12/2/2019	0	1612.664351
Clara USA CTB	Reunion Bay	12/3/2019	0	1589.355006
Clara USA CTB	Reunion Bay	12/4/2019	0	1564.743936
Clara USA CTB	Reunion Bay	12/5/2019	0	1433.173333
Clara USA CTB	Reunion Bay	12/6/2019	0	1473.386914
Clara USA CTB	Reunion Bay	12/7/2019	0	1550.153106
Clara USA CTB	Reunion Bay	12/8/2019	0	2977.863473
Clara USA CTB	Reunion Bay	12/9/2019	0	3962.408447
Clara USA CTB	Reunion Bay	12/10/2019	0	4218.589291
Clara USA CTB	Reunion Bay	12/11/2019	0	4681.273871
Clara USA CTB	Reunion Bay	12/12/2019	0	4802.511816
Clara USA CTB	Reunion Bay	12/13/2019	0	8198.301708
Clara USA CTB	Reunion Bay	12/14/2019	0	8931.5961
Clara USA CTB	Reunion Bay	12/15/2019	0	8351.997474
Clara USA CTB	Reunion Bay	12/16/2019	0	8306.141745
Clara USA CTB	Reunion Bay	12/17/2019	0	6525.532909
Clara USA CTB	Reunion Bay	12/18/2019	0	8235.204387
Clara USA CTB	Reunion Bay	12/19/2019	0	8612.594647
Clara USA CTB	Reunion Bay	12/20/2019	0	8161.340001
	Average 11/21/2018 through 12/18/2018			5501.28

NSPS OOOOa Applicability Determination for Storage tanks

Clara USA CTB	Facility Name
5501.28	Average of first thirty days of production
11/21/2019	Date of first production
10	Number of oil tanks
0.5	Decline factor
6.01	Storage tank emissions - total
2928-2937	Tank numbers
2929, 2936	LACT permissive tanks

Facility Name	Field	Date	Down Time Hours(1)	Actual Oil Production
CONNIE CONNOLLY 21-26H	Bailey	5/7/2019	0	582.05
CONNIE CONNOLLY 21-26H	Bailey	5/8/2019	0	248.90
CONNIE CONNOLLY 21-26H	Bailey	5/12/2019	0	222.43
CONNIE CONNOLLY 21-26H	Bailey	5/13/2019	0	514.07
CONNIE CONNOLLY 21-26H	Bailey	5/14/2019	0	562.17
CONNIE CONNOLLY 21-26H	Bailey	5/15/2019	0	570.82
CONNIE CONNOLLY 21-26H	Bailey	5/16/2019	0	593.47
CONNIE CONNOLLY 21-26H	Bailey	5/17/2019	0	403.30
CONNIE CONNOLLY 21-26H	Bailey	5/18/2019	0	293.06
CONNIE CONNOLLY 21-26H	Bailey	5/19/2019	0	313.35
CONNIE CONNOLLY 21-26H	Bailey	5/20/2019	0	668.73
CONNIE CONNOLLY 21-26H	Bailey	5/21/2019	0	617.30
CONNIE CONNOLLY 21-26H	Bailey	5/22/2019	0	605.96
CONNIE CONNOLLY 21-26H	Bailey	5/23/2019	0	641.90
CONNIE CONNOLLY 21-26H	Bailey	5/24/2019	0	359.33
CONNIE CONNOLLY 21-26H	Bailey	5/25/2019	0	497.76
CONNIE CONNOLLY 21-26H	Bailey	5/26/2019	0	614.61
CONNIE CONNOLLY 21-26H	Bailey	5/27/2019	0	634.83
CONNIE CONNOLLY 21-26H	Bailey	5/28/2019	0	766.44
CONNIE CONNOLLY 21-26H	Bailey	5/29/2019	0	680.82
CONNIE CONNOLLY 21-26H	Bailey	5/30/2019	0	612.64
CONNIE CONNOLLY 21-26H	Bailey	5/31/2019	0	799.49
CONNIE CONNOLLY 21-26H	Bailey	6/1/2019	0	668.55
CONNIE CONNOLLY 21-26H	Bailey	6/2/2019	0	644.56
CONNIE CONNOLLY 21-26H	Bailey	6/3/2019	0	657.03
CONNIE CONNOLLY 21-26H	Bailey	6/4/2019	0	699.23
CONNIE CONNOLLY 21-26H	Bailey	6/5/2019	0	720.55
CONNIE CONNOLLY 21-26H	Bailey	6/6/2019	0	691.55
CONNIE CONNOLLY 21-26H	Bailey	6/7/2019	0	675.12
CONNIE CONNOLLY 21-26H	Bailey	6/8/2019	0	683.39
	Average 5/7/2019 through 6/8/2019			574.78

NSPS OOOOa Applicability Determination for Storage tanks

CONNIE CONNOLLY 21-26H	Facility Name
574.78	Average of first thirty days of production
5/7/2019	Date of first production
3	Number of oil tanks
10.85	Storage tank emissions - total
41640-41642	Tank numbers
41642	LACT permissive tank

Facility Name	Field	Date	Down Time Hours	Actual Oil Production
DEBBIE BAKLENKO USA 12-26H		2/13/2019	0	328.16
DEBBIE BAKLENKO USA 12-26H		2/14/2019	0	578.13
DEBBIE BAKLENKO USA 12-26H		2/15/2019	0	414.02
DEBBIE BAKLENKO USA 12-26H		2/16/2019	0	672.66
DEBBIE BAKLENKO USA 12-26H		2/17/2019	0	592.92
DEBBIE BAKLENKO USA 12-26H		2/18/2019	0	537.81
DEBBIE BAKLENKO USA 12-26H		2/19/2019	0	455.27
DEBBIE BAKLENKO USA 12-26H		2/20/2019	0	499.62
DEBBIE BAKLENKO USA 12-26H		2/21/2019	0	353.72
DEBBIE BAKLENKO USA 12-26H		2/22/2019	0	233.06
DEBBIE BAKLENKO USA 12-26H		2/23/2019	0	404.22
DEBBIE BAKLENKO USA 12-26H		2/24/2019	0	250.43
DEBBIE BAKLENKO USA 12-26H		2/25/2019	0	457.85
DEBBIE BAKLENKO USA 12-26H		2/26/2019	0	398.42
DEBBIE BAKLENKO USA 12-26H		2/27/2019	0	361.73
DEBBIE BAKLENKO USA 12-26H		2/28/2019	0	35.36
DEBBIE BAKLENKO USA 12-26H		3/16/2019	0	321.41
DEBBIE BAKLENKO USA 12-26H		3/17/2019	0	703.51
DEBBIE BAKLENKO USA 12-26H		3/18/2019	0	540.43
DEBBIE BAKLENKO USA 12-26H		3/19/2019	0	469.87
DEBBIE BAKLENKO USA 12-26H		3/20/2019	0	438.81
DEBBIE BAKLENKO USA 12-26H		3/21/2019	0	404.08
DEBBIE BAKLENKO USA 12-26H		3/22/2019	0	394.30
DEBBIE BAKLENKO USA 12-26H		3/23/2019	0	384.39
DEBBIE BAKLENKO USA 12-26H		3/24/2019	0	342.39
DEBBIE BAKLENKO USA 12-26H		3/25/2019	0	356.62
DEBBIE BAKLENKO USA 12-26H		3/26/2019	0	309.30
DEBBIE BAKLENKO USA 12-26H		3/27/2019	0	312.18
DEBBIE BAKLENKO USA 12-26H		3/28/2019	0	301.33
DEBBIE BAKLENKO USA 12-26H		3/29/2019	0	277.10
	Average 2/13/2019 through 3/29/2019			404.30

NSPS OOOOa Applicability Determination for Storage tanks

DEBBIE BAKLENKO USA : Facility Name

404.30 Average of first thirty days of production

2/13/2019 Date of first production

3 Number of oil tanks

1 Decline factor

6.55 Storage tank emissions - total

42036-42038 Tank numbers

42038 LACT permissive tanks

Facility Name	Field	Date	Down Time Hours	Actual Oil Production
GALEN FOX USA 24-7H	Van Hook	3/16/2019	0	525.16
GALEN FOX USA 24-7H	Van Hook	3/17/2019	0	521.09
GALEN FOX USA 24-7H	Van Hook	3/18/2019	0	537.27
GALEN FOX USA 24-7H	Van Hook	3/19/2019	0	511.87
GALEN FOX USA 24-7H	Van Hook	3/20/2019	0	460.39
GALEN FOX USA 24-7H	Van Hook	3/21/2019	0	364.91
GALEN FOX USA 24-7H	Van Hook	3/22/2019	0	362.69
GALEN FOX USA 24-7H	Van Hook	3/23/2019	0	334.18
GALEN FOX USA 24-7H	Van Hook	3/24/2019	0	228.06
GALEN FOX USA 24-7H	Van Hook	3/28/2019	0	52.69
GALEN FOX USA 24-7H	Van Hook	3/29/2019	0	482.86
GALEN FOX USA 24-7H	Van Hook	3/30/2019	0	274.79
GALEN FOX USA 24-7H	Van Hook	3/31/2019	0	640.93
GALEN FOX USA 24-7H	Van Hook	4/1/2019	0	455.49
GALEN FOX USA 24-7H	Van Hook	4/2/2019	0	674.56
GALEN FOX USA 24-7H	Van Hook	4/3/2019	0	263.33
GALEN FOX USA 24-7H	Van Hook	4/4/2019	0	499.98
GALEN FOX USA 24-7H	Van Hook	4/5/2019	0	508.43
GALEN FOX USA 24-7H	Van Hook	4/6/2019	0	538.93
GALEN FOX USA 24-7H	Van Hook	4/7/2019	0	531.15
GALEN FOX USA 24-7H	Van Hook	4/8/2019	0	527.63
GALEN FOX USA 24-7H	Van Hook	4/9/2019	0	525.02
GALEN FOX USA 24-7H	Van Hook	4/10/2019	0	443.36
GALEN FOX USA 24-7H	Van Hook	4/11/2019	0	512.78
GALEN FOX USA 24-7H	Van Hook	4/12/2019	0	637.63
GALEN FOX USA 24-7H	Van Hook	4/13/2019	0	572.63
GALEN FOX USA 24-7H	Van Hook	4/14/2019	0	564.66
GALEN FOX USA 24-7H	Van Hook	4/15/2019	0	475.74
GALEN FOX USA 24-7H	Van Hook	4/16/2019	0	463.22
GALEN FOX USA 24-7H	Van Hook	4/17/2019	0	481.29
	Average 3/16/2019 through 4/17/2019			465.76

NSPS OOOOa Applicability Determination for Storage tanks

GALEN FOX USA 24-7H	Facility Name
465.76	Average of first thirty days of production
3/16/2019	Date of first production
4	Number of oil tanks
1	Decline factor
7.55	Storage tank emissions - total
41945-41948	Tank numbers
4198	LACT permissive tanks

Completion Name	Field	Date	Down Time Hours(1)	Actual Oil Production
Gloria CTB	Jim Creek	11/30/2018	0	4327.4
Gloria CTB	Jim Creek	12/1/2018	0	4126.1
Gloria CTB	Jim Creek	12/2/2018	0	3953.4
Gloria CTB	Jim Creek	12/3/2018	0	3811.4
Gloria CTB	Jim Creek	12/4/2018	0	3750.0
Gloria CTB	Jim Creek	12/5/2018	0	4230.7
Gloria CTB	Jim Creek	12/6/2018	0	5461.0
Gloria CTB	Jim Creek	12/7/2018	0	3868.5
Gloria CTB	Jim Creek	12/8/2018	0	3310.7
Gloria CTB	Jim Creek	12/9/2018	0	1986.0
Gloria CTB	Jim Creek	12/10/2018	0	2651.7
Gloria CTB	Jim Creek	12/11/2018	0	3030.8
Gloria CTB	Jim Creek	12/12/2018	0	2618.8
Gloria CTB	Jim Creek	12/13/2018	0	2859.1
Gloria CTB	Jim Creek	12/14/2018	0	3497.1
Gloria CTB	Jim Creek	12/15/2018	0	4105.1
Gloria CTB	Jim Creek	12/16/2018	0	4131.1
Gloria CTB	Jim Creek	12/17/2018	0	4327.3
Gloria CTB	Jim Creek	12/18/2018	0	4937.4
Gloria CTB	Jim Creek	12/19/2018	0	4112.2
Gloria CTB	Jim Creek	12/20/2018	0	3377.2
Gloria CTB	Jim Creek	12/21/2018	0	4064.8
Gloria CTB	Jim Creek	12/22/2018	0	4526.4
Gloria CTB	Jim Creek	12/23/2018	0	3875.3
Gloria CTB	Jim Creek	12/24/2018	0	3837.2
Gloria CTB	Jim Creek	12/25/2018	0	3536.1
Gloria CTB	Jim Creek	12/26/2018	0	3681.7
Gloria CTB	Jim Creek	12/27/2018	0	3738.2
Gloria CTB	Jim Creek	12/28/2018	0	3688.6
Gloria CTB	Jim Creek	12/29/2018	0	3575.5
	Average 11/30/2018 through 12/29/2018			3766.56

NSPS OOOOa Applicability Determination for Storage tanks

Gloria CTB	Facility Name
3766.56	Average of first thirty days of production
11/30/2018	Date of first production
5	Number of oil tanks
	Date of LACT unit installation
0.6	Decline factor
42.64	Storage tank emissions - total
44065- 44069	Tank numbers
44066, 44067,44069	LACT permissive tank

Completion Name	Field	Date	Down Time Hours	Actual Oil Production
Howard USA CTB	Reunion Bay	2/20/2019	0	7418.38
Howard USA CTB	Reunion Bay	2/21/2019	0	6862.72
Howard USA CTB	Reunion Bay	2/22/2019	0	6633.65
Howard USA CTB	Reunion Bay	2/23/2019	0	6374.93
Howard USA CTB	Reunion Bay	2/24/2019	0	6184.68
Howard USA CTB	Reunion Bay	2/25/2019	0	5784.52
Howard USA CTB	Reunion Bay	2/26/2019	0	5647.97
Howard USA CTB	Reunion Bay	2/27/2019	0	5439.92
Howard USA CTB	Reunion Bay	2/28/2019	0	5225.47
Howard USA CTB	Reunion Bay	3/1/2019	0	5099.40
Howard USA CTB	Reunion Bay	3/2/2019	0	5092.07
Howard USA CTB	Reunion Bay	3/3/2019	0	4904.07
Howard USA CTB	Reunion Bay	3/4/2019	0	4788.38
Howard USA CTB	Reunion Bay	3/5/2019	0	4628.78
Howard USA CTB	Reunion Bay	3/6/2019	0	4421.88
Howard USA CTB	Reunion Bay	3/7/2019	0	4212.57
Howard USA CTB	Reunion Bay	3/8/2019	0	3379.43
Howard USA CTB	Reunion Bay	3/9/2019	0	3205.88
Howard USA CTB	Reunion Bay	3/10/2019	0	2682.27
Howard USA CTB	Reunion Bay	3/11/2019	0	2857.04
Howard USA CTB	Reunion Bay	3/12/2019	0	2228.58
Howard USA CTB	Reunion Bay	3/13/2019	0	2702.22
Howard USA CTB	Reunion Bay	3/14/2019	0	2772.32
Howard USA CTB	Reunion Bay	3/15/2019	0	2697.37
Howard USA CTB	Reunion Bay	3/16/2019	0	2899.84
Howard USA CTB	Reunion Bay	3/17/2019	0	4126.23
Howard USA CTB	Reunion Bay	3/18/2019	0	5037.40
Howard USA CTB	Reunion Bay	3/19/2019	0	5631.52
Howard USA CTB	Reunion Bay	3/20/2019	0	4917.67
Howard USA CTB	Reunion Bay	3/21/2019	0	6208.38
	Average			4668.85

NSPS OOOOa Applicability Determination for Storage tanks

Howard USA CTB	Facility Name
4668.85	Average of first thirty days of production
2/20/2019	Date of first production
8	Number of oil tanks
0.5	Decline factor
37.79	Storage tank emissions - total
2975- 2982	Tank numbers
2977, 2978	LACT permissive tank

Facility Name	Field	Date	Down Time Hours(1)	Actual Oil Production
Irish USA CTB	Antelope	1/15/2019	0	5840.30
Irish USA CTB	Antelope	1/16/2019	0	5545.45
Irish USA CTB	Antelope	1/17/2019	0	5347.42
Irish USA CTB	Antelope	1/18/2019	0	4973.02
Irish USA CTB	Antelope	1/19/2019	0	4851.37
Irish USA CTB	Antelope	1/20/2019	0	4728.47
Irish USA CTB	Antelope	1/21/2019	0	4615.30
Irish USA CTB	Antelope	1/22/2019	0	4026.09
Irish USA CTB	Antelope	1/23/2019	0	2962.24
Irish USA CTB	Antelope	1/24/2019	0	2888.11
Irish USA CTB	Antelope	1/25/2019	0	2358.25
Irish USA CTB	Antelope	1/26/2019	0	2740.70
Irish USA CTB	Antelope	1/27/2019	0	3284.51
Irish USA CTB	Antelope	1/28/2019	0	3074.67
Irish USA CTB	Antelope	1/29/2019	0	3588.30
Irish USA CTB	Antelope	1/30/2019	0	5224.01
Irish USA CTB	Antelope	1/31/2019	0	5276.85
Irish USA CTB	Antelope	2/1/2019	0	4367.23
Irish USA CTB	Antelope	2/2/2019	0	3542.33
Irish USA CTB	Antelope	2/3/2019	0	2837.56
Irish USA CTB	Antelope	2/4/2019	0	1764.89
Irish USA CTB	Antelope	2/5/2019	0	3058.15
Irish USA CTB	Antelope	2/6/2019	0	4623.01
Irish USA CTB	Antelope	2/7/2019	0	4642.16
Irish USA CTB	Antelope	2/8/2019	0	5231.01
Irish USA CTB	Antelope	2/9/2019	0	5625.14
Irish USA CTB	Antelope	2/10/2019	0	5218.58
Irish USA CTB	Antelope	2/11/2019	0	4057.02
Irish USA CTB	Antelope	2/12/2019	0	3877.32
Irish USA CTB	Antelope	2/13/2019	0	3642.92
	Average			4127.08

NSPS OOOOa Applicability Determination for Storage tanks

Irish USA CTB	Facility Name
4127.08	Average of first thirty days of production
1/15/2019	Date of first production
6	Number of oil tanks
0.5	Decline factor
7.92	Storage tank emissions - total
2951-2956	Tank numbers
2952, 2953, 2955	LACT permissive tank

Facility Name	Field	Date	Down Time Hours	Actual Oil Production
Joanne Quale USA CTB	Reunion Bay	2/3/2019	0	9397.57
Joanne Quale USA CTB	Reunion Bay	2/4/2019	0	8793.26
Joanne Quale USA CTB	Reunion Bay	2/5/2019	0	8327.29
Joanne Quale USA CTB	Reunion Bay	2/6/2019	0	7954.53
Joanne Quale USA CTB	Reunion Bay	2/7/2019	0	7703.61
Joanne Quale USA CTB	Reunion Bay	2/8/2019	0	8629.19
Joanne Quale USA CTB	Reunion Bay	2/9/2019	0	9535.99
Joanne Quale USA CTB	Reunion Bay	2/10/2019	0	10601.10
Joanne Quale USA CTB	Reunion Bay	2/11/2019	0	9919.26
Joanne Quale USA CTB	Reunion Bay	2/12/2019	0	9401.46
Joanne Quale USA CTB	Reunion Bay	2/13/2019	0	8990.06
Joanne Quale USA CTB	Reunion Bay	2/14/2019	0	9374.23
Joanne Quale USA CTB	Reunion Bay	2/15/2019	0	10647.11
Joanne Quale USA CTB	Reunion Bay	2/16/2019	0	9999.69
Joanne Quale USA CTB	Reunion Bay	2/17/2019	0	8754.70
Joanne Quale USA CTB	Reunion Bay	2/18/2019	0	9523.01
Joanne Quale USA CTB	Reunion Bay	2/19/2019	0	9218.05
Joanne Quale USA CTB	Reunion Bay	2/20/2019	0	7000.12
Joanne Quale USA CTB	Reunion Bay	2/21/2019	0	6905.59
Joanne Quale USA CTB	Reunion Bay	2/22/2019	0	6824.11
Joanne Quale USA CTB	Reunion Bay	2/23/2019	0	6351.40
Joanne Quale USA CTB	Reunion Bay	2/24/2019	0	5337.98
Joanne Quale USA CTB	Reunion Bay	2/25/2019	0	6303.73
Joanne Quale USA CTB	Reunion Bay	2/26/2019	0	6190.47
Joanne Quale USA CTB	Reunion Bay	2/27/2019	0	5620.29
Joanne Quale USA CTB	Reunion Bay	2/28/2019	0	6240.50
Joanne Quale USA CTB	Reunion Bay	3/1/2019	0	6228.82
Joanne Quale USA CTB	Reunion Bay	3/2/2019	0	6943.00
Joanne Quale USA CTB	Reunion Bay	3/3/2019	0	7092.70
Joanne Quale USA CTB	Reunion Bay	3/4/2019	0	8200.07
	Average			8066.96

NSPS OOOOa Applicability Determination for Storage tanks

Joanne Quale USA CTB	Facility Name
8066.96	Average of first thirty days of production
2/3/2019	Date of first production
6	Number of oil tanks
	Date of LACT unit installation
0.5	Decline factor
26.07	Storage tank emissions - total
2969-2974	Tank numbers
2973, 2974	LACT permissive tank

Facility Name	Field	Date	Down Time Hours	Actual Oil Production
Jones USA CTB	Reunion Bay	12/13/2018	0	7281.15
Jones USA CTB	Reunion Bay	12/14/2018	0	8728.85
Jones USA CTB	Reunion Bay	12/15/2018	0	8355.35
Jones USA CTB	Reunion Bay	12/16/2018	0	6983.96
Jones USA CTB	Reunion Bay	12/17/2018	0	7472.93
Jones USA CTB	Reunion Bay	12/18/2018	0	9527.02
Jones USA CTB	Reunion Bay	12/19/2018	0	9195.15
Jones USA CTB	Reunion Bay	12/20/2018	0	9295.99
Jones USA CTB	Reunion Bay	12/21/2018	0	9313.06
Jones USA CTB	Reunion Bay	12/22/2018	0	10705.45
Jones USA CTB	Reunion Bay	12/23/2018	0	10425.70
Jones USA CTB	Reunion Bay	12/24/2018	0	10208.61
Jones USA CTB	Reunion Bay	12/25/2018	0	7218.75
Jones USA CTB	Reunion Bay	12/26/2018	0	6658.27
Jones USA CTB	Reunion Bay	12/27/2018	0	5502.52
Jones USA CTB	Reunion Bay	12/28/2018	0	5360.58
Jones USA CTB	Reunion Bay	12/29/2018	0	5663.83
Jones USA CTB	Reunion Bay	12/30/2018	0	7572.59
Jones USA CTB	Reunion Bay	12/31/2018	0	6355.33
Jones USA CTB	Reunion Bay	1/1/2019	0	8804.32
Jones USA CTB	Reunion Bay	1/2/2019	0	8732.42
Jones USA CTB	Reunion Bay	1/3/2019	0	8056.61
Jones USA CTB	Reunion Bay	1/4/2019	0	8063.01
Jones USA CTB	Reunion Bay	1/5/2019	0	5937.24
Jones USA CTB	Reunion Bay	1/6/2019	0	5702.70
Jones USA CTB	Reunion Bay	1/7/2019	0	6459.60
Jones USA CTB	Reunion Bay	1/8/2019	0	6159.17
Jones USA CTB	Reunion Bay	1/9/2019	0	6117.61
Jones USA CTB	Reunion Bay	1/10/2019	0	6098.72
Jones USA CTB	Reunion Bay	1/11/2019	0	6170.98
				7604.25

NSPS OOOOa Applicability Determination for Storage tanks

Jones USA CTB	Facility Name
7604.25	Average of first thirty days of production
12/13/2018	Date of first production
12	Number of oil tanks
0.5	Decline factor
37.25	Storage tank emissions - total
2658-2662, 2665-2669, 2926-2927	Tank numbers
2926, 2927, 2669	LACT permissive tanks

Facility Name	Field	Date	Down Time Hours(1)	Actual Oil Production
Kent Carlson 14 CTB	Bailey	7/30/2019	0	4803.95
Kent Carlson 14 CTB	Bailey	7/31/2019	0	3693.67
Kent Carlson 14 CTB	Bailey	8/1/2019	0	2036.01
Kent Carlson 14 CTB	Bailey	8/2/2019	0	1569.27
Kent Carlson 14 CTB	Bailey	8/3/2019	0	2089.77
Kent Carlson 14 CTB	Bailey	8/4/2019	0	2949.13
Kent Carlson 14 CTB	Bailey	8/5/2019	0	3818.22
Kent Carlson 14 CTB	Bailey	8/6/2019	0	4437.64
Kent Carlson 14 CTB	Bailey	8/7/2019	0	4520.48
Kent Carlson 14 CTB	Bailey	8/8/2019	0	4215.45
Kent Carlson 14 CTB	Bailey	8/9/2019	0	4013.91
Kent Carlson 14 CTB	Bailey	8/10/2019	0	2544.48
Kent Carlson 14 CTB	Bailey	8/11/2019	0	2512.50
Kent Carlson 14 CTB	Bailey	8/12/2019	0	3780.09
Kent Carlson 14 CTB	Bailey	8/13/2019	0	3814.63
Kent Carlson 14 CTB	Bailey	8/14/2019	0	3950.66
Kent Carlson 14 CTB	Bailey	8/15/2019	0	4443.90
Kent Carlson 14 CTB	Bailey	8/16/2019	0	4015.63
Kent Carlson 14 CTB	Bailey	8/17/2019	0	4012.84
Kent Carlson 14 CTB	Bailey	8/18/2019	0	4062.60
Kent Carlson 14 CTB	Bailey	8/19/2019	0	4009.45
Kent Carlson 14 CTB	Bailey	8/20/2019	0	4052.70
Kent Carlson 14 CTB	Bailey	8/21/2019	0	4025.67
Kent Carlson 14 CTB	Bailey	8/22/2019	0	4027.37
Kent Carlson 14 CTB	Bailey	8/23/2019	0	4013.49
Kent Carlson 14 CTB	Bailey	8/24/2019	0	3955.58
Kent Carlson 14 CTB	Bailey	8/25/2019	0	3939.36
Kent Carlson 14 CTB	Bailey	8/26/2019	0	3954.54
Kent Carlson 14 CTB	Bailey	8/27/2019	0	3948.48
Kent Carlson 14 CTB	Bailey	8/28/2019	0	3892.08
	Average 7/30/2019 through 8/28/2019			3703.45

NSPS OOOOa Applicability Determination for Storage tanks

Kent Carlson 14 CTB	Facility Name
3703.45	Average of first thirty days of production
7/30/2019	Date of first production
6	Number of oil tanks
0.6	Decline factor
8.17	Storage tank emissions - total
44098-44103	Tank numbers
44098, 44099,44100, 44101	LACT permissive tank

Completion Name	Field	Date	Down Time Hours(1)	Actual Oil Production
Lars CTB	Killdeer	8/27/2018	0	1579.12
Lars CTB	Killdeer	8/28/2018	0	159.85
Lars CTB	Killdeer	8/29/2018	0	944.83
Lars CTB	Killdeer	8/30/2018	0	1233.90
Lars CTB	Killdeer	8/31/2018	0	1545.05
Lars CTB	Killdeer	9/1/2018	0	2232.60
Lars CTB	Killdeer	9/2/2018	0	2271.64
Lars CTB	Killdeer	9/3/2018	0	2217.87
Lars CTB	Killdeer	9/4/2018	0	2635.04
Lars CTB	Killdeer	9/5/2018	0	2072.20
Lars CTB	Killdeer	9/6/2018	0	2371.94
Lars CTB	Killdeer	9/7/2018	0	2238.14
Lars CTB	Killdeer	9/8/2018	0	2114.24
Lars CTB	Killdeer	9/9/2018	0	2280.56
Lars CTB	Killdeer	9/10/2018	0	2292.99
Lars CTB	Killdeer	9/11/2018	0	2171.86
Lars CTB	Killdeer	9/12/2018	0	2413.49
Lars CTB	Killdeer	9/13/2018	0	2058.93
Lars CTB	Killdeer	9/14/2018	0	2358.37
Lars CTB	Killdeer	9/15/2018	0	2233.02
Lars CTB	Killdeer	9/16/2018	0	1953.11
Lars CTB	Killdeer	9/17/2018	0	2416.40
Lars CTB	Killdeer	9/18/2018	0	1858.57
Lars CTB	Killdeer	9/19/2018	0	2030.91
Lars CTB	Killdeer	9/20/2018	0	1850.72
Lars CTB	Killdeer	9/21/2018	0	601.68
Lars CTB	Killdeer	9/22/2018	0	2042.15
Lars CTB	Killdeer	9/23/2018	0	2095.13
Lars CTB	Killdeer	9/24/2018	0	1985.90
Lars CTB	Killdeer	9/25/2018	0	2243.69
	Average 8/27/2018 through 9/25/2018			1950.13

NSPS OOOOa Applicability Determination for Storage tanks

Lars CTB	Facility Name
1950.13	Average of first thirty days of production
8/27/2018	Date of first production
4	Number of oil tanks
	Date of LACT unit installation
0.6	Decline factor
22.08	Storage tank emissions - total
44061- 44064	Tank numbers
44062, 44064	LACT permissive tank

Completion Name	Field	Date	Down Time Hours	Actual Oil Production
Luther - Weidman USA CTB	Reunion Bay	7/9/2019	0	11800.64
Luther - Weidman USA CTB	Reunion Bay	7/10/2019	0	12799.56
Luther - Weidman USA CTB	Reunion Bay	7/11/2019	0	10559.57
Luther - Weidman USA CTB	Reunion Bay	7/12/2019	0	10650.42
Luther - Weidman USA CTB	Reunion Bay	7/13/2019	0	10764.48
Luther - Weidman USA CTB	Reunion Bay	7/14/2019	0	11498.30
Luther - Weidman USA CTB	Reunion Bay	7/15/2019	0	10729.78
Luther - Weidman USA CTB	Reunion Bay	7/16/2019	0	10146.24
Luther - Weidman USA CTB	Reunion Bay	7/17/2019	0	10221.99
Luther - Weidman USA CTB	Reunion Bay	7/18/2019	0	11111.08
Luther - Weidman USA CTB	Reunion Bay	7/19/2019	0	11487.47
Luther - Weidman USA CTB	Reunion Bay	7/20/2019	0	10624.79
Luther - Weidman USA CTB	Reunion Bay	7/21/2019	0	13149.69
Luther - Weidman USA CTB	Reunion Bay	7/22/2019	0	12932.94
Luther - Weidman USA CTB	Reunion Bay	7/23/2019	0	11941.55
Luther - Weidman USA CTB	Reunion Bay	7/24/2019	0	13487.75
Luther - Weidman USA CTB	Reunion Bay	7/25/2019	0	12352.75
Luther - Weidman USA CTB	Reunion Bay	7/26/2019	0	13379.62
Luther - Weidman USA CTB	Reunion Bay	7/27/2019	0	12619.67
Luther - Weidman USA CTB	Reunion Bay	7/28/2019	0	11905.72
Luther - Weidman USA CTB	Reunion Bay	7/29/2019	0	12996.03
Luther - Weidman USA CTB	Reunion Bay	7/30/2019	0	11992.84
Luther - Weidman USA CTB	Reunion Bay	7/31/2019	0	13379.09
Luther - Weidman USA CTB	Reunion Bay	8/1/2019	0	11341.74
Luther - Weidman USA CTB	Reunion Bay	8/2/2019	0	12126.88
Luther - Weidman USA CTB	Reunion Bay	8/3/2019	0	11383.66
Luther - Weidman USA CTB	Reunion Bay	8/4/2019	0	12666.19
Luther - Weidman USA CTB	Reunion Bay	8/5/2019	0	10948.90
Luther - Weidman USA CTB	Reunion Bay	8/6/2019	0	10907.92
Luther - Weidman USA CTB	Reunion Bay	8/7/2019	0	12161.58
	Average			11802.29

NSPS OOOOa Applicability Determination for Storage tanks

Luther - Weidman USA (	Facility Name
11802.29	Average of first thirty days of production
7/9/2019	Date of first production
11	Number of oil tanks
0.5	Decline factor
21.68	Storage tank emissions - total
3025-3035	Tank numbers
3029, 3030, 3032	LACT permissive tank

Completion Name	Field	Date	Down Time Hours(1)	Actual Oil Production
Mason CTB	Killdeer	7/13/2019	0	1875.61
Mason CTB	Killdeer	7/21/2019	0	1479.89
Mason CTB	Killdeer	7/22/2019	0	2146.51
Mason CTB	Killdeer	7/23/2019	0	2523.91
Mason CTB	Killdeer	7/24/2019	0	3580.58
Mason CTB	Killdeer	7/25/2019	0	3757.41
Mason CTB	Killdeer	7/26/2019	0	3742.15
Mason CTB	Killdeer	7/27/2019	0	3709.88
Mason CTB	Killdeer	7/28/2019	0	3826.57
Mason CTB	Killdeer	7/29/2019	0	3809.57
Mason CTB	Killdeer	7/30/2019	0	3568.90
Mason CTB	Killdeer	7/31/2019	0	3703.80
Mason CTB	Killdeer	8/1/2019	0	3710.54
Mason CTB	Killdeer	8/2/2019	0	3489.56
Mason CTB	Killdeer	8/3/2019	0	3597.91
Mason CTB	Killdeer	8/4/2019	0	3385.51
Mason CTB	Killdeer	8/5/2019	0	3663.21
Mason CTB	Killdeer	8/6/2019	0	3354.41
Mason CTB	Killdeer	8/7/2019	0	3338.13
Mason CTB	Killdeer	8/8/2019	0	3398.96
Mason CTB	Killdeer	8/9/2019	0	3325.73
Mason CTB	Killdeer	8/10/2019	0	3314.56
Mason CTB	Killdeer	8/11/2019	0	3276.83
Mason CTB	Killdeer	8/12/2019	0	3259.22
Mason CTB	Killdeer	8/13/2019	0	3253.65
Mason CTB	Killdeer	8/14/2019	0	3147.54
Mason CTB	Killdeer	8/15/2019	0	3201.31
Mason CTB	Killdeer	8/16/2019	0	3177.30
Mason CTB	Killdeer	8/17/2019	0	2458.86
Mason CTB	Killdeer	8/18/2019	0	2851.39
	Average 7/13/2019 through 8/18/2019			3230.98

NSPS OOOOa Applicability Determination for Storage tanks

Mason CTB	Facility Name
3230.98	Average of first thirty days of production
7/13/2019	Date of first production
6	Number of oil tanks
0.6	Decline factor
36.58	Storage tank emissions - total
44104-44109	Tank numbers
44105, 44108, 44108	LACT permissive tank

Facility Name	Field	Date	Down Time Hours	Actual Oil Production
Ness USA CTB	Reunion Bay	12/2/2018	0	5089.79
Ness USA CTB	Reunion Bay	12/3/2018	0	5680.42
Ness USA CTB	Reunion Bay	12/4/2018	0	6922.74
Ness USA CTB	Reunion Bay	12/5/2018	0	6273.51
Ness USA CTB	Reunion Bay	12/6/2018	0	6967.67
Ness USA CTB	Reunion Bay	12/7/2018	0	6186.38
Ness USA CTB	Reunion Bay	12/8/2018	0	5861.33
Ness USA CTB	Reunion Bay	12/9/2018	0	5105.19
Ness USA CTB	Reunion Bay	12/10/2018	0	6266.02
Ness USA CTB	Reunion Bay	12/11/2018	0	6955.84
Ness USA CTB	Reunion Bay	12/12/2018	0	7528.36
Ness USA CTB	Reunion Bay	12/13/2018	0	4862.43
Ness USA CTB	Reunion Bay	12/14/2018	0	6276.37
Ness USA CTB	Reunion Bay	12/15/2018	0	7708.57
Ness USA CTB	Reunion Bay	12/16/2018	0	7327.32
Ness USA CTB	Reunion Bay	12/17/2018	0	6920.51
Ness USA CTB	Reunion Bay	12/18/2018	0	7011.05
Ness USA CTB	Reunion Bay	12/19/2018	0	7728.17
Ness USA CTB	Reunion Bay	12/20/2018	0	7023.49
Ness USA CTB	Reunion Bay	12/21/2018	0	6273.13
Ness USA CTB	Reunion Bay	12/22/2018	0	5659.46
Ness USA CTB	Reunion Bay	12/23/2018	0	5725.21
Ness USA CTB	Reunion Bay	12/24/2018	0	6024.20
Ness USA CTB	Reunion Bay	12/25/2018	0	5749.14
Ness USA CTB	Reunion Bay	12/26/2018	0	6159.64
Ness USA CTB	Reunion Bay	12/27/2018	0	3601.52
Ness USA CTB	Reunion Bay	12/28/2018	0	6253.54
Ness USA CTB	Reunion Bay	12/29/2018	0	4358.00
Ness USA CTB	Reunion Bay	12/30/2018	0	4414.01
Ness USA CTB	Reunion Bay	12/31/2018	0	4931.83
	Average 12/2/2018 through 12/31/2018			6094.83

NSPS OOOOa Applicability Determination for Storage tanks

Ness USA CTB	Facility Name
6094.83	Average of first thirty days of production
12/2/2018	Date of first production
8	Number of oil tanks
0.5	Decline factor
49.37	Storage tank emissions - total
2938-2945	Tank numbers
2,941	LACT permissive tanks

Facility Name	Field	Date	Down Time Hours	Actual Oil Production
Ranger USA CTB		10/20/2018	0	8964.2
Ranger USA CTB		10/21/2018	0	8106.35
Ranger USA CTB		10/22/2018	0	8055.866667
Ranger USA CTB		10/23/2018	0	9250.45
Ranger USA CTB		10/24/2018	0	9820.173597
Ranger USA CTB		10/25/2018	0	10017.33043
Ranger USA CTB		10/26/2018	0	11868.71642
Ranger USA CTB		10/27/2018	0	12373.27879
Ranger USA CTB		10/28/2018	0	12211.47768
Ranger USA CTB		10/29/2018	0	11917.85722
Ranger USA CTB		10/30/2018	0	11456.20132
Ranger USA CTB		10/31/2018	0	11594.74639
Ranger USA CTB		11/1/2018	0	10571.38339
Ranger USA CTB		11/2/2018	0	11791.96202
Ranger USA CTB		11/3/2018	0	11790.72652
Ranger USA CTB		11/4/2018	0	11848.02974
Ranger USA CTB		11/5/2018	0	9313.576863
Ranger USA CTB		11/6/2018	0	10186.76563
Ranger USA CTB		11/7/2018	0	10886.2297
Ranger USA CTB		11/8/2018	0	10683.36912
Ranger USA CTB		11/9/2018	0	10482.53904
Ranger USA CTB		11/10/2018	0	10432.8417
Ranger USA CTB		11/11/2018	0	10212.02423
Ranger USA CTB		11/12/2018	0	10137.20613
Ranger USA CTB		11/13/2018	0	9786.922935
Ranger USA CTB		11/14/2018	0	10186.31221
Ranger USA CTB		11/15/2018	0	9746.858582
Ranger USA CTB		11/16/2018	0	8692.463436
Ranger USA CTB		11/17/2018	0	9130.916125
Ranger USA CTB		11/18/2018	0	9356.481405
	Average 3/7/2019 through 4/18/2019			10362.44

NSPS OOOOa Applicability Determination for Storage tanks

Ranger USA CTB	Facility Name
10362.44	Average of first thirty days of production
10/20/2018	Date of first production
10	Number of oil tanks
0.5	Decline factor
39.26	Storage tank emissions - total
2907-2916,	Tank numbers
2916 , 2912, 2915	LACT permissive tanks

Completion Name	Field	Date	Down Time Hours	Actual Oil Production
Red Feather USA CTB	Reunion Bay	7/16/2019	0	8846.02
Red Feather USA CTB	Reunion Bay	7/17/2019	0	8192.94
Red Feather USA CTB	Reunion Bay	7/18/2019	0	8246.61
Red Feather USA CTB	Reunion Bay	7/19/2019	0	8721.08
Red Feather USA CTB	Reunion Bay	7/20/2019	0	7945.42
Red Feather USA CTB	Reunion Bay	7/21/2019	0	8781.65
Red Feather USA CTB	Reunion Bay	7/22/2019	0	10021.37
Red Feather USA CTB	Reunion Bay	7/23/2019	0	10337.54
Red Feather USA CTB	Reunion Bay	7/24/2019	0	12305.32
Red Feather USA CTB	Reunion Bay	7/25/2019	0	11405.60
Red Feather USA CTB	Reunion Bay	7/26/2019	0	10848.38
Red Feather USA CTB	Reunion Bay	7/27/2019	0	11690.16
Red Feather USA CTB	Reunion Bay	7/28/2019	0	11364.39
Red Feather USA CTB	Reunion Bay	7/29/2019	0	10189.57
Red Feather USA CTB	Reunion Bay	7/30/2019	0	10725.50
Red Feather USA CTB	Reunion Bay	7/31/2019	0	10606.78
Red Feather USA CTB	Reunion Bay	8/1/2019	0	10185.42
Red Feather USA CTB	Reunion Bay	8/2/2019	0	10720.49
Red Feather USA CTB	Reunion Bay	8/3/2019	0	10004.94
Red Feather USA CTB	Reunion Bay	8/4/2019	0	9774.76
Red Feather USA CTB	Reunion Bay	8/5/2019	0	9823.81
Red Feather USA CTB	Reunion Bay	8/6/2019	0	8821.51
Red Feather USA CTB	Reunion Bay	8/7/2019	0	9543.06
Red Feather USA CTB	Reunion Bay	8/8/2019	0	9527.39
Red Feather USA CTB	Reunion Bay	8/9/2019	0	8701.56
Red Feather USA CTB	Reunion Bay	8/10/2019	0	9209.06
Red Feather USA CTB	Reunion Bay	8/11/2019	0	8512.43
Red Feather USA CTB	Reunion Bay	8/12/2019	0	8965.75
Red Feather USA CTB	Reunion Bay	8/13/2019	0	9067.06
Red Feather USA CTB	Reunion Bay	8/14/2019	0	8452.02
	Average			9717.92

NSPS OOOOa Applicability Determination for Storage tanks

Red Feather USA CTB	Facility Name
9717.92	Average of first thirty days of production
7/16/2019	Date of first production
11	Number of oil tanks
	Date of LACT unit installation
0.5	Decline factor
19.56	Storage tank emissions - total
3011-3021	Tank numbers
3014, 3015, 3017	LACT permissive tank

Completion Name	Field	Date	Down Time Hours(1)	Actual Oil Production
Ringer CTB	Bailey	1/2/2019	0	3525.87
Ringer CTB	Bailey	1/3/2019	0	3331.32
Ringer CTB	Bailey	1/4/2019	0	3207.46
Ringer CTB	Bailey	1/5/2019	0	3014.02
Ringer CTB	Bailey	1/6/2019	0	3036.83
Ringer CTB	Bailey	1/7/2019	0	3048.57
Ringer CTB	Bailey	1/8/2019	0	2744.34
Ringer CTB	Bailey	1/9/2019	0	2816.63
Ringer CTB	Bailey	1/10/2019	0	2645.81
Ringer CTB	Bailey	1/11/2019	0	2674.74
Ringer CTB	Bailey	1/12/2019	0	2596.23
Ringer CTB	Bailey	1/13/2019	0	2635.60
Ringer CTB	Bailey	1/14/2019	0	2363.45
Ringer CTB	Bailey	1/15/2019	0	1477.75
Ringer CTB	Bailey	1/16/2019	0	1374.52
Ringer CTB	Bailey	1/17/2019	0	1013.52
Ringer CTB	Bailey	1/18/2019	0	1192.36
Ringer CTB	Bailey	1/19/2019	0	1178.01
Ringer CTB	Bailey	1/20/2019	0	1423.09
Ringer CTB	Bailey	1/21/2019	0	1448.62
Ringer CTB	Bailey	1/22/2019	0	1976.06
Ringer CTB	Bailey	1/23/2019	0	2652.57
Ringer CTB	Bailey	1/24/2019	0	2448.11
Ringer CTB	Bailey	1/25/2019	0	2716.46
Ringer CTB	Bailey	1/26/2019	0	2134.12
Ringer CTB	Bailey	1/27/2019	0	1709.65
Ringer CTB	Bailey	1/28/2019	0	2561.23
Ringer CTB	Bailey	1/29/2019	0	2470.26
Ringer CTB	Bailey	1/30/2019	0	3023.76
Ringer CTB	Bailey	1/31/2019	0	2979.57
	Average 1/1/2019 through 1/31/2019			2380.68

NSPS OOOOa Applicability Determination for Storage tanks

Ringer CTB	Facility Name
2380.68	Average of first thirty days of production
1/2/2019	Date of first production
9	Number of oil tanks
	Date of LACT unit installation
0.6	Decline factor
26.95	Storage tank emissions - total
43594- 436002	Tank numbers
43597	LACT permissive tank

Completion Name	Field	Date	Down Time Hours(1)	Actual Oil Production
Rosa Benz CTB	Chimney Butte	8/18/2019	0	3109.78
Rosa Benz CTB	Chimney Butte	8/19/2019	0	4730.81
Rosa Benz CTB	Chimney Butte	8/20/2019	0	5403.98
Rosa Benz CTB	Chimney Butte	8/21/2019	0	5841.38
Rosa Benz CTB	Chimney Butte	8/22/2019	0	6063.09
Rosa Benz CTB	Chimney Butte	8/23/2019	0	6107.67
Rosa Benz CTB	Chimney Butte	8/24/2019	0	6317.78
Rosa Benz CTB	Chimney Butte	8/25/2019	0	6233.81
Rosa Benz CTB	Chimney Butte	8/26/2019	0	5529.27
Rosa Benz CTB	Chimney Butte	8/27/2019	0	4939.47
Rosa Benz CTB	Chimney Butte	8/28/2019	0	5170.20
Rosa Benz CTB	Chimney Butte	8/29/2019	0	5771.25
Rosa Benz CTB	Chimney Butte	8/30/2019	0	6157.38
Rosa Benz CTB	Chimney Butte	8/31/2019	0	5201.49
Rosa Benz CTB	Chimney Butte	9/1/2019	0	4360.29
Rosa Benz CTB	Chimney Butte	9/2/2019	0	5628.75
Rosa Benz CTB	Chimney Butte	9/3/2019	0	6665.41
Rosa Benz CTB	Chimney Butte	9/4/2019	0	6421.95
Rosa Benz CTB	Chimney Butte	9/5/2019	0	5103.74
Rosa Benz CTB	Chimney Butte	9/6/2019	0	5679.32
Rosa Benz CTB	Chimney Butte	9/7/2019	0	5442.08
Rosa Benz CTB	Chimney Butte	9/8/2019	0	563.15
Rosa Benz CTB	Chimney Butte	9/9/2019	0	2240.07
Rosa Benz CTB	Chimney Butte	9/10/2019	0	4506.38
Rosa Benz CTB	Chimney Butte	9/11/2019	0	5120.65
Rosa Benz CTB	Chimney Butte	9/12/2019	0	1490.83
Rosa Benz CTB	Chimney Butte	9/13/2019	0	1477.72
Rosa Benz CTB	Chimney Butte	9/14/2019	0	4211.24
Rosa Benz CTB	Chimney Butte	9/15/2019	0	5426.93
Rosa Benz CTB	Chimney Butte	9/16/2019	0	5676.21
	Average 8/18/2019 through 9/16/2019			4886.40

NSPS OOOOa Applicability Determination for Storage tanks

Rosa Benz CTB	Facility Name
4886.40	Average of first thirty days of production
8/18/2019	Date of first production
8	Number of oil tanks
0.6	Decline factor
14.48	Storage tank emissions - total
44049-44051, 44056-44060	Tank numbers
44092, 44093, 44095	LACT permissive tank

Facility Name	Field	Date	Down Time Hours	Actual Oil Production
Shobe USA CTB		11/22/2018	0	4356.19
Shobe USA CTB		11/23/2018	0	4053.23
Shobe USA CTB		11/24/2018	0	4324.27
Shobe USA CTB		11/25/2018	0	4199.48
Shobe USA CTB		11/26/2018	0	4019.96
Shobe USA CTB		11/27/2018	0	3781.29
Shobe USA CTB		11/28/2018	0	2013.63
Shobe USA CTB		11/29/2018	0	3772.00
Shobe USA CTB		11/30/2018	0	3933.50
Shobe USA CTB		12/1/2018	0	2542.44
Shobe USA CTB		12/2/2018	0	4187.48
Shobe USA CTB		12/3/2018	0	4161.63
Shobe USA CTB		12/4/2018	0	3776.88
Shobe USA CTB		12/5/2018	0	3770.73
Shobe USA CTB		12/6/2018	0	3929.52
Shobe USA CTB		12/7/2018	0	3770.94
Shobe USA CTB		12/8/2018	0	3734.19
Shobe USA CTB		12/9/2018	0	3425.33
Shobe USA CTB		12/10/2018	0	3360.92
Shobe USA CTB		12/11/2018	0	3402.44
Shobe USA CTB		12/12/2018	0	2576.98
Shobe USA CTB		12/13/2018	0	1385.44
Shobe USA CTB		12/14/2018	0	1445.06
Shobe USA CTB		12/15/2018	0	1836.60
Shobe USA CTB		12/16/2018	0	1733.52
Shobe USA CTB		12/17/2018	0	2131.37
Shobe USA CTB		12/18/2018	0	2414.08
Shobe USA CTB		12/19/2018	0	1470.42
Shobe USA CTB		12/20/2018	0	1558.17
Shobe USA CTB		12/21/2018	0	2297.50
	Average 11/22/2018 through 12/21/2018			3112.17

NSPS OOOOa Applicability Determination for Storage tanks

Shobe USA CTB	Facility Name
3112.17	Average of first thirty days of production
11/22/2018	Date of first production
5	Number of oil tanks
0.5	Decline factor
25.21	Storage tank emissions - total
2946-2950	Tank numbers
2947, 2948, 2950	LACT permissive tanks

Completion Name	Field	Date	Down Time Hours(1)	Actual Oil Production
State Egger CTB	Killdeer	7/20/2019	0	4428.72
State Egger CTB	Killdeer	7/21/2019	0	4124.69
State Egger CTB	Killdeer	7/22/2019	0	3803.00
State Egger CTB	Killdeer	7/23/2019	0	4592.45
State Egger CTB	Killdeer	7/24/2019	0	3333.63
State Egger CTB	Killdeer	7/25/2019	0	3950.82
State Egger CTB	Killdeer	7/26/2019	0	4651.39
State Egger CTB	Killdeer	7/27/2019	0	5956.17
State Egger CTB	Killdeer	7/28/2019	0	5954.36
State Egger CTB	Killdeer	7/29/2019	0	5877.37
State Egger CTB	Killdeer	7/30/2019	0	5626.39
State Egger CTB	Killdeer	7/31/2019	0	5563.72
State Egger CTB	Killdeer	8/1/2019	0	5260.11
State Egger CTB	Killdeer	8/2/2019	0	5373.91
State Egger CTB	Killdeer	8/3/2019	0	5256.33
State Egger CTB	Killdeer	8/4/2019	0	5447.47
State Egger CTB	Killdeer	8/5/2019	0	5076.54
State Egger CTB	Killdeer	8/6/2019	0	5402.79
State Egger CTB	Killdeer	8/7/2019	0	5008.75
State Egger CTB	Killdeer	8/8/2019	0	4907.32
State Egger CTB	Killdeer	8/9/2019	0	4975.74
State Egger CTB	Killdeer	8/10/2019	0	4994.41
State Egger CTB	Killdeer	8/11/2019	0	4774.87
State Egger CTB	Killdeer	8/12/2019	0	4880.47
State Egger CTB	Killdeer	8/13/2019	0	4987.58
State Egger CTB	Killdeer	8/14/2019	0	4829.97
State Egger CTB	Killdeer	8/15/2019	0	4920.30
State Egger CTB	Killdeer	8/16/2019	0	4799.49
State Egger CTB	Killdeer	8/17/2019	0	4774.54
State Egger CTB	Killdeer	8/18/2019	0	4790.53
	Average7/18/2019 through 8/18/2019			4944.13

NSPS OOOOa Applicability Determination for Storage tanks

State Egger CTB	Facility Name
4944.13	Average of first thirty days of production
7/20/2019	Date of first production
6	Number of oil tanks
0.6	Decline factor
55.98	Storage tank emissions - total
44110-44115	Tank numbers
444111, 44112,44114	LACT permissive tank

Completion Name	Field	Date	Down Time Hours(1)	Actual Oil Production
State Krieger CTB	Bayle	4/18/2019	0	2047.90
State Krieger CTB	Bayle	4/19/2019	0	1671.12
State Krieger CTB	Bayle	4/20/2019	0	1708.40
State Krieger CTB	Bayle	4/21/2019	0	1164.00
State Krieger CTB	Bayle	4/22/2019	0	1139.57
State Krieger CTB	Bayle	4/23/2019	0	1040.64
State Krieger CTB	Bayle	4/24/2019	0	1258.16
State Krieger CTB	Bayle	4/25/2019	0	1050.82
State Krieger CTB	Bayle	4/26/2019	0	1541.46
State Krieger CTB	Bayle	4/27/2019	0	1872.18
State Krieger CTB	Bayle	4/28/2019	0	1618.44
State Krieger CTB	Bayle	4/29/2019	0	2240.79
State Krieger CTB	Bayle	4/30/2019	0	2818.88
State Krieger CTB	Bayle	5/1/2019	0	2428.78
State Krieger CTB	Bayle	5/2/2019	0	2564.59
State Krieger CTB	Bayle	5/3/2019	0	2770.13
State Krieger CTB	Bayle	5/4/2019	0	2782.55
State Krieger CTB	Bayle	5/5/2019	0	2534.83
State Krieger CTB	Bayle	5/6/2019	0	2785.38
State Krieger CTB	Bayle	5/7/2019	0	2515.69
State Krieger CTB	Bayle	5/8/2019	0	2337.68
State Krieger CTB	Bayle	5/9/2019	0	2619.35
State Krieger CTB	Bayle	5/10/2019	0	2509.73
State Krieger CTB	Bayle	5/11/2019	0	2531.18
State Krieger CTB	Bayle	5/12/2019	0	2536.84
State Krieger CTB	Bayle	5/13/2019	0	1862.86
State Krieger CTB	Bayle	5/14/2019	0	2443.42
State Krieger CTB	Bayle	5/15/2019	0	2386.92
State Krieger CTB	Bayle	5/16/2019	0	2117.01
State Krieger CTB	Bayle	5/17/2019	0	2391.48
	Average4/18/2019 through 5/17/2019			2109.69

NSPS OOOOa Applicability Determination for Storage tanks

State Krieger CTB	Facility Name
2109.69	Average of first thirty days of production
4/18/2019	Date of first production
6	Number of oil tanks
0.6	Decline factor
23.89	Storage tank emissions - total
44078-44083	Tank numbers
44079, 44080	LACT permissive tank

Facility Name	Field	Date	Down Time Hours	Actual Oil Production
TAT USA 13 CTB	Reunion Bay	11/7/2018	0	8312.38
TAT USA 13 CTB	Reunion Bay	11/8/2018	0	6722.35
TAT USA 13 CTB	Reunion Bay	11/9/2018	0	6995.69
TAT USA 13 CTB	Reunion Bay	11/10/2018	0	7450.88
TAT USA 13 CTB	Reunion Bay	11/11/2018	0	5760.35
TAT USA 13 CTB	Reunion Bay	11/12/2018	0	5775.91
TAT USA 13 CTB	Reunion Bay	11/13/2018	0	5990.22
TAT USA 13 CTB	Reunion Bay	11/14/2018	0	5681.54
TAT USA 13 CTB	Reunion Bay	11/15/2018	0	6369.23
TAT USA 13 CTB	Reunion Bay	11/16/2018	0	6240.48
TAT USA 13 CTB	Reunion Bay	11/17/2018	0	3908.20
TAT USA 13 CTB	Reunion Bay	11/18/2018	0	5596.70
TAT USA 13 CTB	Reunion Bay	11/19/2018	0	6252.93
TAT USA 13 CTB	Reunion Bay	11/20/2018	0	7199.58
TAT USA 13 CTB	Reunion Bay	11/21/2018	0	9424.48
TAT USA 13 CTB	Reunion Bay	11/22/2018	0	9930.57
TAT USA 13 CTB	Reunion Bay	11/23/2018	0	10272.10
TAT USA 13 CTB	Reunion Bay	11/24/2018	0	10619.70
TAT USA 13 CTB	Reunion Bay	11/25/2018	0	10290.09
TAT USA 13 CTB	Reunion Bay	11/26/2018	0	9677.78
TAT USA 13 CTB	Reunion Bay	11/27/2018	0	11508.08
TAT USA 13 CTB	Reunion Bay	11/28/2018	0	4996.73
TAT USA 13 CTB	Reunion Bay	11/29/2018	0	8628.23
TAT USA 13 CTB	Reunion Bay	11/30/2018	0	8160.23
TAT USA 13 CTB	Reunion Bay	12/1/2018	0	6478.31
TAT USA 13 CTB	Reunion Bay	12/2/2018	0	7499.42
TAT USA 13 CTB	Reunion Bay	12/3/2018	0	7928.69
TAT USA 13 CTB	Reunion Bay	12/4/2018	0	6184.57
TAT USA 13 CTB	Reunion Bay	12/5/2018	0	7686.56
TAT USA 13 CTB	Reunion Bay	12/6/2018	0	8017.65
	Average			7518.65

NSPS OOOOa Applicability Determination for Storage tanks

TAT USA 13 CTB	Facility Name
7518.65	Average of first thirty days of production
11/7/2018	Date of first production
9	Number of oil tanks
0.5	Decline factor
20.92	Storage tank emissions - total
2895-2900	Tank numbers
2897, 2898, 2900	LACT permissive tank

Completion Name	Field	Date	Down Time Hours(1)	Actual Oil Production
Two Bar CTB	Bailey	4/26/2019	0	4868.04
Two Bar CTB	Bailey	4/27/2019	0	4425.98
Two Bar CTB	Bailey	4/28/2019	0	4445.95
Two Bar CTB	Bailey	4/29/2019	0	4485.73
Two Bar CTB	Bailey	4/30/2019	0	4766.58
Two Bar CTB	Bailey	5/1/2019	0	4271.64
Two Bar CTB	Bailey	5/2/2019	0	4463.72
Two Bar CTB	Bailey	5/3/2019	0	4757.46
Two Bar CTB	Bailey	5/4/2019	0	4929.06
Two Bar CTB	Bailey	5/5/2019	0	5807.83
Two Bar CTB	Bailey	5/6/2019	0	5458.68
Two Bar CTB	Bailey	5/7/2019	0	5267.32
Two Bar CTB	Bailey	5/8/2019	0	4638.71
Two Bar CTB	Bailey	5/9/2019	0	4564.57
Two Bar CTB	Bailey	5/10/2019	0	4644.21
Two Bar CTB	Bailey	5/11/2019	0	5065.53
Two Bar CTB	Bailey	5/12/2019	0	5138.96
Two Bar CTB	Bailey	5/13/2019	0	5552.66
Two Bar CTB	Bailey	5/14/2019	0	5914.66
Two Bar CTB	Bailey	5/15/2019	0	6157.84
Two Bar CTB	Bailey	5/16/2019	0	6173.82
Two Bar CTB	Bailey	5/17/2019	0	6347.90
Two Bar CTB	Bailey	5/18/2019	0	5474.37
Two Bar CTB	Bailey	5/19/2019	0	5675.75
Two Bar CTB	Bailey	5/20/2019	0	6052.10
Two Bar CTB	Bailey	5/21/2019	0	5919.43
Two Bar CTB	Bailey	5/22/2019	0	4505.49
Two Bar CTB	Bailey	5/23/2019	0	5246.26
Two Bar CTB	Bailey	5/24/2019	0	5692.41
Two Bar CTB	Bailey	5/25/2019	0	5737.30
	Average 4/26/2019 through 5/25/2019			5215.00

NSPS OOOOa Applicability Determination for Storage tanks

Two Bar CTB	Facility Name
5215.00	Average of first thirty days of production
4/26/2019	Date of first production
8	Number of oil tanks
0.6	Decline factor
23.56	Storage tank emissions - total
44070-44077	Tank numbers
44072, 44073, 44075	LACT permissive tank

Facility Name	Field	Date	Down Time Hours(1)	Actual Oil Production
Yellow Otter CTB	Four Bears	3/1/2019	0	3858.18
Yellow Otter CTB	Four Bears	3/2/2019	0	3951.23
Yellow Otter CTB	Four Bears	3/3/2019	0	3534.01
Yellow Otter CTB	Four Bears	3/4/2019	0	3696.74
Yellow Otter CTB	Four Bears	3/5/2019	0	3460.16
Yellow Otter CTB	Four Bears	3/6/2019	0	3770.83
Yellow Otter CTB	Four Bears	3/7/2019	0	3051.45
Yellow Otter CTB	Four Bears	3/8/2019	0	1556.09
Yellow Otter CTB	Four Bears	3/9/2019	0	1020.27
Yellow Otter CTB	Four Bears	3/10/2019	0	626.70
Yellow Otter CTB	Four Bears	3/11/2019	0	2560.11
Yellow Otter CTB	Four Bears	3/12/2019	0	2677.70
Yellow Otter CTB	Four Bears	3/13/2019	0	2121.38
Yellow Otter CTB	Four Bears	3/14/2019	0	1825.61
Yellow Otter CTB	Four Bears	3/15/2019	0	1918.68
Yellow Otter CTB	Four Bears	3/16/2019	0	1886.60
Yellow Otter CTB	Four Bears	3/17/2019	0	1641.05
Yellow Otter CTB	Four Bears	3/18/2019	0	3308.98
Yellow Otter CTB	Four Bears	3/19/2019	0	3434.77
Yellow Otter CTB	Four Bears	3/20/2019	0	4255.92
Yellow Otter CTB	Four Bears	3/21/2019	0	5106.71
Yellow Otter CTB	Four Bears	3/22/2019	0	4495.01
Yellow Otter CTB	Four Bears	3/23/2019	0	4185.17
Yellow Otter CTB	Four Bears	3/24/2019	0	3930.70
Yellow Otter CTB	Four Bears	3/25/2019	0	3848.71
Yellow Otter CTB	Four Bears	3/26/2019	0	3959.05
Yellow Otter CTB	Four Bears	3/27/2019	0	3768.46
Yellow Otter CTB	Four Bears	3/28/2019	0	3686.39
Yellow Otter CTB	Four Bears	3/29/2019	0	3556.70
Yellow Otter CTB	Four Bears	3/30/2019	0	3508.67
	Average through			3140.07

NSPS OOOOa Applicability Determination for Storage tanks

Yellow Otter CTB	Facility Name
3140.07	Average of first thirty days of production
3/1/2019	Date of first production
5	Number of oil tanks
0.5	Decline factor
25.42	Storage tank emissions - total
2991-2995	Tank numbers
2992, 2993, 2995	LACT permissive tank

Completion Name	Field	Date	Down Time Hours	Actual Oil Production
Zelda USA CTB	Reunion Bay	1/24/2019	0	4714.59
Zelda USA CTB	Reunion Bay	1/25/2019	0	4267.47
Zelda USA CTB	Reunion Bay	1/26/2019	0	4036.08
Zelda USA CTB	Reunion Bay	1/27/2019	0	3827.08
Zelda USA CTB	Reunion Bay	1/28/2019	0	3779.90
Zelda USA CTB	Reunion Bay	1/29/2019	0	3530.67
Zelda USA CTB	Reunion Bay	1/30/2019	0	3485.49
Zelda USA CTB	Reunion Bay	1/31/2019	0	3315.18
Zelda USA CTB	Reunion Bay	2/1/2019	0	3263.01
Zelda USA CTB	Reunion Bay	2/2/2019	0	3170.97
Zelda USA CTB	Reunion Bay	2/3/2019	0	3101.80
Zelda USA CTB	Reunion Bay	2/4/2019	0	3019.39
Zelda USA CTB	Reunion Bay	2/5/2019	0	2938.74
Zelda USA CTB	Reunion Bay	2/6/2019	0	2909.60
Zelda USA CTB	Reunion Bay	2/7/2019	0	2822.64
Zelda USA CTB	Reunion Bay	2/8/2019	0	2795.38
Zelda USA CTB	Reunion Bay	2/9/2019	0	1402.53
Zelda USA CTB	Reunion Bay	2/10/2019	0	1305.38
Zelda USA CTB	Reunion Bay	2/11/2019	0	689.89
Zelda USA CTB	Reunion Bay	2/12/2019	0	631.72
Zelda USA CTB	Reunion Bay	2/13/2019	0	787.74
Zelda USA CTB	Reunion Bay	2/14/2019	0	819.58
Zelda USA CTB	Reunion Bay	2/15/2019	0	761.58
Zelda USA CTB	Reunion Bay	2/16/2019	0	1074.78
Zelda USA CTB	Reunion Bay	2/17/2019	0	1806.00
Zelda USA CTB	Reunion Bay	2/18/2019	0	1859.66
Zelda USA CTB	Reunion Bay	2/19/2019	0	2418.13
Zelda USA CTB	Reunion Bay	2/20/2019	0	3268.30
Zelda USA CTB	Reunion Bay	2/21/2019	0	1880.34
Zelda USA CTB	Reunion Bay	2/22/2019	0	2780.92
	Average			2548.82

NSPS OOOOa Applicability Determination for Storage tanks

Zelda USA CTB	Facility Name
2548.82	Average of first thirty days of production
1/24/2019	Date of first production
6	Number of oil tanks
	Date of LACT unit installation
0.5	Decline factor
8.24	Storage tank emissions - total
2969-2974	Tank numbers
2973, 2974	LACT permissive tank

Appendix F– Storage Tank Requirements Deviations

Appendix F– Storage Tank Requirements Deviations			
Location	Inspection Date	Fix Date	Comments
LARS CTB	8/29/18	8/29/18	Leak on flare component
LENA 14-22H CTB	9/14/18	9/14/18	Ignitor Not Functioning
HUNTS ALONG USA PAD	9/18/18	9/19/18	Flare Pilot Malfunction
CHIMNEY BUTTE 34-11H	9/25/18	9/25/18	Thief Hatch Leak
CHIMNEY BUTTE CTB	9/25/18	10/22/18	Vent Line Leak
DELIA USA PAD	9/25/18	10/22/18	Vent Line Leak
EAGLE USA 41-15H	10/10/18	10/10/18	Thief Hatch Leak
CHIMNEY BUTTE CTB	10/24/18	11/20/18	Load Line Leaks
CHIMNEY BUTTE CTB	10/24/18	11/27/18	Load Line Leaks
DELIA USA PAD	10/24/18	11/30/18	Vent Line Leaks
VOIGT PAD	10/24/18	11/21/18	Load Line Leak
RED FEATHER USA PAD	10/30/18	10/30/18	Flare Pilot Malfunction
CLARKS CREEK USA CTB	11/2/18	11/2/18	Thief Hatch Leak
BEAR DEN PAD	11/5/18	11/9/18	Flare Pilot Malfunction
STARK USA CTB	9/25/18	9/25/18	Vent Line Leak
MIKKELSEN 11-14H	11/7/18	11/7/18	Flare Pilot Malfunction
STOHLER 41 CTB	11/29/18	12/3/18	Manway Cover Leak
KEMPF TRUST 21-14H	12/6/18	1/8/19	Flare Pilot Malfunction
DEBBIE BAKLENKO USA 12-26H	12/12/18	12/12/18	Flare Pilot Malfunction
BECK CTB	12/21/18	12/28/18	Thief Hatch Leak
CLARA USA CTB	12/21/18	12/21/18	Thief Hatch Leak
CLARA USA CTB	12/21/18	12/21/18	Thief Hatch Leak
CLARA USA CTB	12/21/18	12/21/18	Thief Hatch Leak
CLARA USA CTB	12/21/18	12/21/18	Thief Hatch Leak
CLARA USA CTB	12/21/18	12/21/18	Thief Hatch Leak
CLARA USA CTB	12/21/18	12/21/18	Thief Hatch Leak
CLARA USA CTB	12/21/18	12/21/18	Thief Hatch Leak
MICHELLE USA CTB	12/21/18	12/21/18	Thief Hatch Leak
NESS USA CTB (SHOBE)	12/21/18	12/21/18	Flare Pilot Malfunction
SHOBE USA CTB	12/21/18	12/21/18	Thief Hatch Leak
TAT USA 13 CTB	12/21/18	12/21/18	Thief Hatch Leak
DELIA USA PAD	12/21/18	12/28/18	Thief Hatch Leak
IRON WOMAN CTB (KERMIT)	12/26/18	12/28/18	Flare Pilot Malfunction
DELIA USA PAD	12/28/18	12/28/18	Thief Hatch Leak
DELIA USA PAD	1/7/19	1/17/19	Thief Hatch Leak
MIKELSEN USA CTB	1/15/19	1/15/19	Thief Hatch Leak
PEARL CTB	1/15/19	1/15/19	Thief Hatch Leak
EAGLE USA 41-15H	1/18/19	1/18/19	Thief Hatch Leak
LARS CTB	1/23/19	1/21/19	Thief Hatch Leak
TAT USA 13 PAD	1/23/19	1/22/19	Flare Pilot Malfunction
CHIMNEY BUTTE CTB	1/24/19	2/26/19	Load Line Leak

Appendix F– Storage Tank Requirements Deviations			
Location	Inspection Date	Fix Date	Comments
CHIMNEY BUTTE CTB	1/24/19	2/26/19	Thief Hatch Leak
JONES USA CTB	1/31/19	1/31/19	Flare Pilot Malfunction
RINGER CTB	12/31/18	12/31/18	Thief Hatch Leak
RINGER CTB	12/31/18	12/31/18	Thief Hatch Leak
DELIA USA PAD	2/18/19	2/18/19	Thief Hatch Leak
ANNIE USA PAD	2/21/19	2/21/19	Flare Pilot Malfunction
CHRISTENSEN PAD	2/15/19	2/15/19	Thief Hatch Leak
KEMPF TRUST 21-14H	2/22/19	2/22/19	Thief Hatch Leak
LARS CTB	2/18/19	2/18/19	Thief Hatch Leak
DEBBIE BAKLENKO USA 12-26H	2/25/19	2/25/19	Thief Hatch Leak
LADONNA KLATT PAD	2/25/19	4/22/19	Flare thermocouple malfunction
IRISH USA PAD	2/27/19	2/26/19	Flare Pilot Malfunction
JOANNE QUALE USA CTB	2/28/19	7/10/19	Thief Hatch Leak
JOANNE QUALE USA CTB	2/28/19	7/10/19	Thief Hatch Leak
JOANNE QUALE USA CTB	2/28/19	7/10/19	Thief Hatch Leak
JOANNE QUALE USA CTB	2/28/19	7/10/19	Thief Hatch Leak
STARK CTB	2/28/19	2/28/19	Flare Pilot Malfunction
TAT USA 13 PAD	3/20/19	3/20/19	Flare Pilot Malfunction
CHIMNEY BUTTE CTB	3/25/19	4/9/19	Load Line Leaks
MARTINEZ USA PAD	3/25/19	4/2/19	Flare thermocouple malfunction
MIKELSEN USA CTB	3/29/19	3/29/19	Thief Hatch Leak
MIKELSEN USA CTB	3/29/19	3/29/19	Vent Line Leak
JONES USA CTB	4/2/19	5/20/19	Flare thermocouple malfunction
HOWARD USA CTB	4/4/19	4/4/19	Flare Pilot Malfunction
HOWARD USA PAD	4/5/19	5/17/19	Vent line leak
RAYMOND USA PAD	4/8/19	4/8/19	Flare thermocouple malfunction
WM & AGNES SCOTT PAD	4/25/19	5/6/19	Vent Line Leak
CHIMNEY BUTTE CTB	5/1/19	5/6/19	Load Line Leaks
DELIA USA PAD	5/1/19	5/7/19	Vent Line Leak
Raymond USA Pad	5/2/19	5/2/19	Thief hatch Leak
TAT USA 13 PAD	5/3/19	5/3/19	Flare Pilot Malfunction
DELIA USA PAD	5/8/19	5/8/19	Flare Pilot Malfunction
TAT USA 34 PAD	5/15/19	7/2/19	Manway Leak
TAT USA 34 PAD	5/15/19	7/2/19	Manway Leak
TAT USA 34 PAD	5/15/19	7/16/19	Manway Leak
TAT USA 34 PAD	5/15/19	7/16/19	Manway Leak
TAT USA 34 PAD	5/15/19	7/16/19	Manway Leak
TAT USA 34 PAD	5/15/19	7/16/19	Manway Leak
TAT USA 34 PAD	5/15/19	7/2/19	Manway Leak
TAT USA 34 PAD	5/15/19	7/2/19	Manway Leak
TAT USA 34 CTB	5/20/19	5/20/19	Thief Hatch Leak
TAT USA 34 PAD	5/20/19	5/20/19	Thief Hatch Leak

Appendix F– Storage Tank Requirements Deviations			
Location	Inspection Date	Fix Date	Comments
STATE KREIGER CTB	5/20/19	5/20/19	Thief Hatch Leak
CHRISTENSEN PAD	5/28/19	6/4/19	Load Line Leaks
DELIA USA PAD	5/28/19	7/5/19	Vent Line Leak
DEBBIE BAKLENKO USA 12-26H	6/5/19	6/5/19	Flare Pilot Malfunction
CLARA USA PAD	6/8/19	7/2/19	Manway Leak
BURSHIA USA CTB	6/11/19	6/17/19	Vic Clamp on Tank Rod Leak
BAKER USA PAD	6/12/19	6/12/19	vent line connection leak
BAKER USA PAD	6/12/19	6/12/19	Thief Hatch Leak
BURSHIA USA CTB	6/12/19	6/12/19	Vent line scrubber connection leak
BURSHIA USA CTB	6/12/19	6/12/19	Thief Hatch Leak
BURSHIA USA CTB	6/12/19	6/12/19	Thief Hatch Leak
PELTON 24-31H	6/18/19	7/5/19	Thief Hatch Leak
TROTTER 14-23H	6/18/19	6/18/19	Thief Hatch Leak
TAT USA 34 PAD	6/20/19	6/20/19	Thief Hatch Leak
VERONICA USA PAD	6/20/19	6/20/19	Thief Hatch Leak
BINGO PAD	6/26/19	6/27/19	Thief Hatch Leak
AXELL USA CTB	6/27/19	7/9/19	Thief Hatch Leak
AXELL USA CTB	6/27/19	7/9/19	Thief Hatch Leak
CHIMNEY BUTTE CTB	6/27/19	7/19/19	Load Line Leak
HUNTS ALONG USA PAD	6/27/19	6/27/19	Thief Hatch Leak
SHERMAN USA CTB	6/27/19	6/27/19	Thief Hatch Leak
SHOBE USA CTB	6/27/19	7/10/19	Thief Hatch Leak
SHOBE USA CTB	6/27/19	7/10/19	Thief Hatch Leak
SHOBE USA CTB	6/27/19	7/10/19	Thief Hatch Leak
SHOBE USA CTB	6/27/19	7/10/19	Thief Hatch Leak
SHOBE USA CTB	6/27/19	7/10/19	Thief Hatch Leak
SHOBE USA CTB	6/27/19	7/10/19	Thief Hatch Leak
SHOBE USA CTB	6/27/19	7/10/19	Thief Hatch Leak
SIBYL USA 44-19TFH CTB	6/27/19	7/10/19	Thief Hatch Leak
SIBYL USA 44-19TFH CTB	6/27/19	7/10/19	Thief Hatch Leak
KEMPF TRUST 21-14H	6/28/19	6/28/19	Thief Hatch Leak
KEMPF TRUST 21-14H	6/28/19	6/28/19	Thief Hatch Leak
CLARA USA PAD	6/29/19	6/29/19	Thief Hatch Leak
JONES USA CTB	6/29/19	6/29/19	Thief Hatch Leak
KERMIT USA CTB	6/29/19	6/29/19	Thief Hatch Leak
LARS CTB	7/3/19	7/3/19	Thief Hatch Leak
NESS USA CTB	7/8/19	7/8/19	Thief Hatch Leak
NESS USA CTB	7/8/19	7/8/19	Thief Hatch Leak
NESS USA CTB	7/8/19	7/8/19	Thief Hatch Leak
NESS USA CTB	7/8/19	7/8/19	Thief Hatch Leak
NESS USA CTB	7/8/19	7/8/19	Thief Hatch Leak
NESS USA CTB	7/8/19	7/8/19	Thief Hatch Leak

Appendix F– Storage Tank Requirements Deviations			
Location	Inspection Date	Fix Date	Comments
JONES USA CTB	7/15/19	7/15/19	Thief Hatch Leak
EARL PENNINGTON PAD	6/24/19	7/2/2019	Manway Leak

Appendix G – Fugitive Emissions Components Monitoring Surveys

ApppendixG - Fugitive Emissions Components Monitoring Surveys

Facility Record No	Identification of Each Affected Facility	Date of Survey	Survey Begin Time	Survey End Time	Ambient Temperature During Survey	Sky Conditions During Survey	Maximum Wind Speed During Survey	Monitoring Instrument Used	2nd Monitoring Instrument Used	Name of Surveyor	Deviations From Monitoring Plan If none State none	Type of Component for which Fugitive Emissions Detected	Number of Each Component for Which Fugitive Emissions Detected	Date of Successful Repair of Fugitive Emissions Component	Type of Instrument Used to Resurvey Components Not Repaired During Original Survey	Reason For Delay of Repair
2018082816.0	Hugo Pad	8/28/2018	08:15:00	09:15:00	52	Overcast	1	FLIR / BK 1 - 4402088		(b) (6) [redacted]	No					
2018092123.0	Earl Pennington USA Pad	9/21/2018	11:04:00	11:58:00	43.4	Overcast	7.4	FLIR / Insight - 44401177		[redacted]	No					
2018100317.0	William Kukla Pad	10/3/2018	11:35:00	12:08:00	36	Overcast	20	FLIR / BK 1 - 4402088		[redacted]	No					
2018100434.0	Charchenko 14 Pad	10/4/2018	12:50:00	13:11:00	39	Overcast	17	FLIR / BK 1 - 4402088		[redacted]	No					
2018101010.0	Tescher 11-27H Pad	10/10/2018	11:10:00	11:23:00	31	Overcast	14	FLIR / BK 1 - 4402088		[redacted]	No					
2018101132.0	Martinez USA 24-8H	10/11/2018	12:56:00	13:23:00	38	Partly Cloudy	8	FLIR / BK 1 - 4402088		[redacted]	No					
2018102310.0	Bear Den Pad	10/23/2018	12:30:00	13:03:00	53	Sunny	7	FLIR / BK 1 - 4402088		[redacted]	No					
201810245.0	Kermit USA Pad	10/23/2018	14:45:00	14:45:00	58	Sunny	7	FLIR / BK 1 - 4402088		[redacted]	No					
2018102624.0	O'Neil 34 Pad	10/26/2018	12:05:00	12:18:00	56	Partly Cloudy	17	FLIR / BK 1 - 4402088		[redacted]	No					
2018102916.0	Trotter Pad	10/29/2018	13:00:00	13:28:00	41	Overcast	8	FLIR / BK 1 - 4402088		[redacted]	No					
2018103011.0	Pelton Pad	10/30/2018	09:55:00	09:17:00	36	Sunny	10	FLIR / BK 1 - 4402088		[redacted]	No					
2018103015.0	TAT USA 13 Pad	10/25/2018	10:58:00	10:58:00	58	Sunny	7	FLIR / BK 1 - 4402088		[redacted]	No					
2018103016.0	Chapman	10/30/2018	09:40:00	10:00:00	39	Sunny		FLIR / BK 1 - 4402088		[redacted]	No					
2018103022.0	Voigt Pad	10/30/2018	10:20:00	10:39:00	39	Sunny	10	FLIR / BK 1 - 4402088		[redacted]	No					
2018103034.0	Bethol CTB	10/30/2018	12:30:00	13:02:00	52	Sunny	17	FLIR / BK 1 - 4402088		[redacted]	No					
2018110218.0	Grady USA Pad	11/1/2018	15:00:00	15:00:00	46	Partly Cloudy	10	FLIR / BK 1 - 4402088		[redacted]	No					
2018110232.0	Sherman Pad	11/1/2018	16:00:00	16:00:00	46	Partly Cloudy	10	FLIR / BK 1 - 4402088		[redacted]	No					
2018110610.0	TAT USA 34 Pad	10/31/2018	14:07:00	14:40:00	46	Sunny	5	FLIR / BK 1 - 4402088		[redacted]	No					
2018110611.0	Jones USA Pad	10/31/2018	15:15:00	15:45:00	49	Sunny	5	FLIR / BK 1 - 4402088		[redacted]	No					
2018110613.0	Clarks Creek USA Pad	11/1/2018	15:45:00	16:00:00	49	Partly Cloudy	10	FLIR / BK 1 - 4402088		[redacted]	No					
2018110811.0	Fred Hansen Pad	11/8/2018	12:10:00	12:33:00	21	Overcast	10	FLIR / BK 1 - 4402088		[redacted]	No					
2018110815.0	Mary Hansen Pad	11/8/2018	12:50:00	13:13:00	21	Overcast		FLIR / BK 1 - 4402088		[redacted]	No					
2018110818.0	Repp Trust Pad	11/8/2018	13:20:00	13:51:00	18	Overcast	10	FLIR / BK 1 - 4402088		[redacted]	No					
201811272.0	Myrmidon-Hunts Along Pad	11/12/2018	14:43:00	14:43:00	18	Sunny	5	FLIR / BK 1 - 4402088		[redacted]	No					
2018112720.0	Veronica USA Pad	11/26/2018	12:00:00	12:00:00	16	Partly Cloudy	5	FLIR / BK 1 - 4402088		[redacted]	No					
201811273.0	Pearl Pad	11/13/2018	09:04:00	09:06:00	25	Sunny		FLIR / BK 1 - 4402088		[redacted]	No					
201811274.0	Mikkelsen 11-14H	11/13/2018	09:30:00	09:30:00	25	Sunny	5	FLIR / BK 1 - 4402088		[redacted]	No					
201811275.0	Goldberg USA 24-33TFH	11/13/2018	09:45:00	09:45:00	28	Sunny	5	FLIR / BK 1 - 4402088		[redacted]	No					
201811276.0	Raymond USA 41-4H	11/13/2018	10:00:00	10:00:00	28	Sunny	5	FLIR / BK 1 - 4402088		[redacted]	No					
201811277.0	Goldberg USA Pad	11/13/2018	09:45:00	09:45:00	28	Sunny	5	FLIR / BK 1 - 4402088		[redacted]	No					
201811278.0	Raymond USA Pad	11/13/2018	10:00:00	10:00:00	28	Sunny	5	FLIR / BK 1 - 4402088		[redacted]	No					

ApppendixG - Fugitive Emissions Components Monitoring Surveys

Facility Record No	Identification of Each Affected Facility	Date of Survey	Survey Begin Time	Survey End Time	Ambient Temperature During Survey	Sky Conditions During Survey	Maximum Wind Speed During Survey	Monitoring Instrument Used	2nd Monitoring Instrument Used	Name of Surveyor	Deviations From Monitoring Plan If none State none	Type of Component for which Fugitive Emissions Detected	Number of Each Component for Which Fugitive Emissions Detected	Date of Successful Repair of Fugitive Emissions Component	Type of Instrument Used to Resurvey Components Not Repaired During Original Survey	Reason For Delay of Repair
201811279.0	Moline-Lacey Pad	11/13/2018	10:30:00	10:30:00	36	Sunny	5	FLIR / BK 1 - 4402088		(b) (6) [redacted]	No					
2018113010.0	Quill Pad	11/30/2018	11:20:00	11:40:00	34	Partly Cloudy	7	FLIR / FLIR Loaner 74900418			No					
2018113014.0	Christensen Pad	11/30/2018	12:30:00	12:52:00	36	Overcast	7	FLIR / FLIR Loaner 74900418			No					
2018113016.0	Repp Pad	11/30/2018	13:03:00	13:19:00	37	Overcast	7	FLIR / FLIR Loaner 74900418			No					
2018113017.0	Darcy / Evelyn-Patrick Pad	11/30/2018	13:25:00	13:47:00	37	Overcast	7	FLIR / FLIR Loaner 74900418			No					
2018120418.0	Lars Pad	12/4/2018	13:43:00	14:15:00	30	Partly Cloudy	19	FLIR / FLIR Loaner 74900418			No					
2018120710.0	LaDonna Klatt Pad	12/7/2018	13:50:00	14:14:00	28	Sunny	8	FLIR / FLIR Loaner 74900418			No					
2018121012.0	Ringer Pad	12/10/2018	12:30:00	13:07:00	42	Partly Cloudy		FLIR / FLIR Loaner 74900418			Yes					
2018121826.0	Marlin 44-12H	12/18/2018	12:38:00	12:50:00	47	Partly Cloudy	7	FLIR / FLIR Loaner 74900418			No					
2018121928.0	Ranger USA Pad	12/19/2018	10:11:00	23:05:00	37	Partly Cloudy	14.9	FLIR / Insight - 44401177			No					
201812269.0	Axell Pad	12/26/2018	10:49:00	11:56:00	14	Overcast	10.3	FLIR / Insight - 44401177			No					
201901169.0	Gloria Pad	1/15/2019	13:25:00	14:30:00	26	Overcast	12	FLIR / BK 2 - 4440657			No					
2019022813.1	Goodall USA Pad	2/26/2019	11:16:00	12:13:00	-1	Partly Cloudy	19.4	FLIR / Insight - 44401177			No					
201904046.0	Stark Pad	4/3/2019	10:40:00	12:40:00	34	Partly Cloudy	10.7	FLIR / Insight - 44401177			No					
201904052.0	Yellow Otter USA CTB	4/3/2019	13:56:00	14:56:00	45	Sunny	13.9	FLIR / Insight - 44401177			No					
201904245.0	Charchenko 14 Pad	4/24/2019	08:25:00	08:45:00	54	Partly Cloudy	9	FLIR / BK 2 - 4440657			No					
2019050710.0	Gloria Pad	5/7/2019	09:20:00	09:03:00	41	Partly Cloudy	13	FLIR / BK 2 - 4440657			No					
2019051019.0	Bill Connolly / Bluegrass Pad	5/10/2019	12:15:00	12:39:00	62	Partly Cloudy	18	FLIR / BK 2 - 4440657			No					
2019051020.0	O'Neil 24 Pad	5/10/2019	12:15:00	13:00:00	62	Partly Cloudy	18	FLIR / BK 2 - 4440657			No					
2019051022.0	O'Neil 34 Pad	5/10/2019	13:03:00	13:22:00	65	Partly Cloudy	18	FLIR / BK 2 - 4440657			No					
2019051511.0	Felix USA Pad	5/14/2019	11:00:00	11:30:00	69	Sunny	11	FLIR / BK 2 - 4440657			No					
2019051727.0	Veronica USA Pad	5/14/2019	12:30:00	13:10:00	65	Sunny	7	FLIR / BK 1 - 4402088			No					
2019051728.0	Kermit USA Pad	5/14/2019	13:40:00	14:15:00	65	Sunny	7	FLIR / BK 1 - 4402088			No					
2019052210.0	Appledoorn 14 Pad	5/22/2019	09:15:00	09:31:00	47	Overcast	16	FLIR / BK 2 - 4440657			No					
2019053121.0	Repp Trust Pad	5/31/2019	07:30:00	07:53:00	53	Sunny	10	FLIR / BK 2 - 4440657			No					
2019053125.0	Quill Pad	5/31/2019	09:32:00	09:47:00	56	Sunny		FLIR / BK 2 - 4440657			No					
201905318.0	Larry Repp 31 Pad	5/31/2019	07:10:00	07:28:00	52	Sunny	10	FLIR / BK 2 - 4440657			No					
2019060614.0	Christensen Pad	6/6/2019	11:31:00	11:47:00	80	Sunny	12	FLIR / BK 2 - 4440657			No					

ApppendixG - Fugitive Emissions Components Monitoring Surveys

Facility Record No	Identification of Each Affected Facility	Date of Survey	Survey Begin Time	Survey End Time	Ambient Temperature During Survey	Sky Conditions During Survey	Maximum Wind Speed During Survey	Monitoring Instrument Used	2nd Monitoring Instrument Used	Name of Surveyor	Deviations From Monitoring Plan If none State none	Type of Component for which Fugitive Emissions Detected	Number of Each Component for Which Fugitive Emissions Detected	Date of Successful Repair of Fugitive Emissions Component	Type of Instrument Used to Resurvey Components Not Repaired During Original Survey	Reason For Delay of Repair
2019060624.0	Repp Pad	6/6/2019	13:02:00	13:25:00	83	Sunny	12	FLIR / BK 2 - 4440657		(b) (6) [redacted]	No					
2019060634.0	Myrmidon-Hunts Along Pad	5/30/2019	11:00:00	12:02:00	78	Sunny	7	FLIR / BK 1 - 4402088		[redacted]	No					
2019060638.0	Sherman Pad	5/31/2019	10:00:00	10:45:00	53	Sunny	10	FLIR / BK 1 - 4402088		[redacted]	No					
2019060639.0	Clarks Creek USA Pad	5/28/2019	12:00:00	12:30:00	63	Sunny	5	FLIR / BK 1 - 4402088		[redacted]	No					
2019060640.0	Eagle USA Pad	5/22/2019	12:05:00	12:40:00	50	Partly Cloudy	8	FLIR / BK 1 - 4402088		[redacted]	No					
2019060641.0	Bear Den Pad	5/22/2019	12:40:00	12:40:00	51	Partly Cloudy	8	FLIR / BK 1 - 4402088		[redacted]	No					
201906181.0	Moline-Lacey Pad	6/17/2019	14:05:00	14:40:00	68	Sunny	5	FLIR / BK 1 - 4402088		[redacted]	No					
201906184.0	Grady USA Pad	6/7/2019	14:20:00	15:00:00	83	Sunny	10	FLIR / BK 1 - 4402088		[redacted]	No					
2019061867.0	Ranger USA Pad	6/18/2019	11:30:00	11:30:00	62	Sunny	5	FLIR / BK 1 - 4402088		[redacted]	No					
2019061913.0	Connie Connolly Pad	6/19/2019	10:25:00	10:54:00	61	Overcast	14	FLIR / BK 2 - 4440657		[redacted]	No					
2019061918.0	Voigt Pad	6/19/2019	11:42:00	12:00:00	61	Overcast	15	FLIR / BK 2 - 4440657		[redacted]	No					
201906197.0	Gravel Coulee Pad	6/19/2019	08:30:00	09:10:00	59	Overcast	11	FLIR / BK 2 - 4440657		[redacted]	No					
201906209.0	Weninger USA Pad	6/19/2019	09:30:00	10:45:00	65	Sunny	5	FLIR / BK 1 - 4402088		[redacted]	No					
2019062128.0	Earl Pennington USA Pad	6/21/2019	11:00:00	11:00:00	65	Overcast	2	FLIR / BK 1 - 4402088		[redacted]	No					
2019062129.0	Kattevold USA 14-34TFH	6/21/2019	11:30:00	11:59:00	65	Overcast	2	FLIR / BK 1 - 4402088		[redacted]	No					
2019062513.0	Mikkelsen 11-14H	6/24/2019	07:00:00	07:34:00	61	Sunny	2	FLIR / BK 1 - 4402088		[redacted]	No					
2019062514.0	Myrmidon #1 SWD Pad	6/24/2019	07:35:00	07:50:00	61	Sunny	2	FLIR / BK 1 - 4402088		[redacted]	No					
2019062515.0	Pearl Pad	6/24/2019	08:10:00	08:19:00	61	Sunny	2	FLIR / BK 1 - 4402088		[redacted]	No					
2019062516.0	Shrader 41-13H	6/24/2019	08:20:00	08:20:00	61	Sunny	2	FLIR / BK 1 - 4402088		[redacted]	No					
2019062517.0	Homme 11-18 TFH	6/24/2019	08:20:00	08:20:00	61	Sunny	2	FLIR / BK 1 - 4402088		[redacted]	No					
2019062627.0	Oscar Stohler Pad	6/26/2019	11:39:00	12:12:00	77	Partly Cloudy	4	FLIR / BK 2 - 4440657		[redacted]	No					
2019070317.0	Ringer Pad	7/3/2019	09:25:00	09:58:00	63	Partly Cloudy	9	FLIR / BK 2 - 4440657		[redacted]	No					
2019070921.0	Beck Pad	7/9/2019	08:01:00	08:51:00	64	Overcast	11	FLIR / BK 2 - 4440657		[redacted]	No					
2019070926.0	Delia USA pad	7/9/2019	08:50:00	09:41:00	63	Overcast	11	FLIR / BK 2 - 4440657		[redacted]	No					
2019072316.0	TAT USA 13 Pad	7/23/2019	11:20:00	12:53:00	82	Partly Cloudy	9	FLIR / BK 2 - 4440657		[redacted]	No					
2018082826.0	Gravel Coulee Pad	8/28/2018	10:30:00	10:55:00	53	Overcast	2	FLIR / BK 1 - 4402088		[redacted]	No	Thief hatches or other openings on a controlled storage vessel	1	9/24/2018	FLIR / Bakken 1 - 44402088	
2018082826.0	Gravel Coulee Pad	8/28/2018	10:30:00	10:55:00	53	Overcast	2	FLIR / BK 1 - 4402088		[redacted]	No	Thief hatches or other openings on a controlled storage vessel	1	8/30/2018		

ApppendixG - Fugitive Emissions Components Monitoring Surveys

Facility Record No	Identification of Each Affected Facility	Date of Survey	Survey Begin Time	Survey End Time	Ambient Temperature During Survey	Sky Conditions During Survey	Maximum Wind Speed During Survey	Monitoring Instrument Used	2nd Monitoring Instrument Used	Name of Surveyor	Deviations From Monitoring Plan If none State none	Type of Component for which Fugitive Emissions Detected	Number of Each Component for Which Fugitive Emissions Detected	Date of Successful Repair of Fugitive Emissions Component	Type of Instrument Used to Resurvey Components Not Repaired During Original Survey	Reason For Delay of Repair
2018082826.0	Gravel Coulee Pad	8/28/2018	10:30:00	10:55:00	53	Overcast	2	FLIR / BK 1 - 4402088		(b) (6) [redacted]	No	Thief hatches or other openings on a controlled storage vessel	1	9/24/2018		
2018082826.0	Gravel Coulee Pad	8/28/2018	10:30:00	10:55:00	53	Overcast	2	FLIR / BK 1 - 4402088		[redacted]	No	Thief hatches or other openings on a controlled storage vessel	1	8/30/2018		
2018090510.0	Chimney Butte 34-11H	9/5/2018	10:15:00	10:59:00	60	Partly Cloudy	7	FLIR / BK 1 - 4402088		[redacted]	No	Thief hatches or other openings on a controlled storage vessel	1	9/24/2018		
2018090510.0	Chimney Butte 34-11H	9/5/2018	10:15:00	10:59:00	60	Partly Cloudy	7	FLIR / BK 1 - 4402088		[redacted]	No	Thief hatches or other openings on a controlled storage vessel	1	9/24/2018		
2018092513.0	Chimney Butte Pad	9/25/2018	09:00:00	09:36:00	45	Overcast	14	FLIR / BK 1 - 4402088		[redacted]	No	Thief hatches or other openings on a controlled storage vessel	1	10/3/2018	FLIR / Bakken 1 - 44402088	
2018092513.0	Chimney Butte Pad	9/25/2018	09:00:00	09:36:00	45	Overcast	14	FLIR / BK 1 - 4402088		[redacted]	No	Thief hatches or other openings on a controlled storage vessel	1	9/26/2018		
2018100817.0	Wm & Agnes Scott Pad	10/8/2018	12:25:00	13:00:00	39	Overcast	2	FLIR / BK 1 - 4402088		[redacted]	No	Covers and Closed Vent Systems	1	10/9/2018		
2018100817.0	Wm & Agnes Scott Pad	10/8/2018	12:25:00	13:00:00	39	Overcast	2	FLIR / BK 1 - 4402088		[redacted]	No	Covers and Closed Vent Systems	1	10/16/2018		
2018102626.0	O'Neil 24 Pad	10/26/2018	12:20:00	12:37:00	56	Partly Cloudy	17	FLIR / BK 1 - 4402088		[redacted]	No	Thief hatches or other openings on a controlled storage vessel	1	10/26/2018		
2018102626.0	O'Neil 24 Pad	10/26/2018	12:20:00	12:37:00	56	Partly Cloudy	17	FLIR / BK 1 - 4402088		[redacted]	No	Thief hatches or other openings on a controlled storage vessel	1	10/31/2018		
201810318.0	Eagle USA Pad	10/31/2018	10:02:00	10:15:00	33	Sunny	5	FLIR / BK 1 - 4402088		[redacted]	No	Thief hatches or other openings on a controlled storage vessel	1	11/6/2018		
201810318.0	Eagle USA Pad	10/31/2018	10:02:00	10:15:00	33	Sunny	5	FLIR / BK 1 - 4402088		[redacted]	No	Thief hatches or other openings on a controlled storage vessel	1	11/1/2018		
2018110716.0	Appledoorn 14 Pad	11/7/2018	12:45:00	13:08:00	19	Overcast		FLIR / BK 1 - 4402088		[redacted]	No	Pressure Relief Devices	1	11/7/2018		
2018110816.0	Larry Repp 31 Pad	11/8/2018	13:12:00	13:27:00	21	Overcast	10	FLIR / BK 1 - 4402088		[redacted]	No	Pressure Relief Devices	1	11/9/2018		
201812044.0	Kempf Trust Pad	12/4/2018	10:20:00	10:53:00	29	Overcast	17	FLIR / FLIR Loaner 74900418		[redacted]	No	Pressure Relief Devices	1	12/4/2018		

ApppendixG - Fugitive Emissions Components Monitoring Surveys

Facility Record No	Identification of Each Affected Facility	Date of Survey	Survey Begin Time	Survey End Time	Ambient Temperature During Survey	Sky Conditions During Survey	Maximum Wind Speed During Survey	Monitoring Instrument Used	2nd Monitoring Instrument Used	Name of Surveyor	Deviations From Monitoring Plan If none State none	Type of Component for which Fugitive Emissions Detected	Number of Each Component for Which Fugitive Emissions Detected	Date of Successful Repair of Fugitive Emissions Component	Type of Instrument Used to Resurvey Components Not Repaired During Original Survey	Reason For Delay of Repair
2018121824.0	Marlin 14 Pad	12/18/2018	11:35:00	12:08:00	44	Partly Cloudy	7	FLIR / FLIR Loaner 74900418		(b) (6) [redacted]	No	Thief hatches or other openings on a controlled storage vessel	1	12/19/2018		
2018121824.0	Marlin 14 Pad	12/18/2018	11:35:00	12:08:00	44	Partly Cloudy	7	FLIR / FLIR Loaner 74900418			No	Thief hatches or other openings on a controlled storage vessel	1	1/3/2019		
201812207.0	Beck Pad	12/20/2018	09:00:00	10:03:00	37	Sunny	11	FLIR / FLIR Loaner 74900418			No	Thief hatches or other openings on a controlled storage vessel	1	12/20/2018		
201812207.0	Beck Pad	12/20/2018	09:00:00	10:03:00	37	Sunny	11	FLIR / FLIR Loaner 74900418			No	Thief hatches or other openings on a controlled storage vessel	1	1/3/2019	FLIR / Bakken 2 - 44400657	
201812207.0	Beck Pad	12/20/2018	09:00:00	10:03:00	37	Sunny	11	FLIR / FLIR Loaner 74900418			No	Thief hatches or other openings on a controlled storage vessel	1	12/20/2018		
201812207.0	Beck Pad	12/20/2018	09:00:00	10:03:00	37	Sunny	11	FLIR / FLIR Loaner 74900418			No	Thief hatches or other openings on a controlled storage vessel	1	1/3/2019	FLIR / Bakken 2 - 44400657	
2018122010.0	Delia USA pad	12/20/2018	10:10:00	14:41:00	38	Sunny	10	FLIR / FLIR Loaner 74900418			No	Thief hatches or other openings on a controlled storage vessel	1	12/20/2018		
2018122010.0	Delia USA pad	12/20/2018	10:10:00	14:41:00	38	Sunny	10	FLIR / FLIR Loaner 74900418			No	Thief hatches or other openings on a controlled storage vessel	1	1/3/2019	FLIR / Bakken 2 - 44400657	
2019012214.4	TAT USA 13 Pad	1/21/2019	10:31:00	11:51:00	9	Overcast	6.7	FLIR / Insight - 74900499			No	Thief hatches or other openings on a controlled storage vessel	1	1/23/2019		
2019012214.4	TAT USA 13 Pad	1/21/2019	10:31:00	11:51:00	9	Overcast	6.7	FLIR / Insight - 74900499			No		0	2/19/2019		
2019012214.4	TAT USA 13 Pad	1/21/2019	10:31:00	11:51:00	9	Overcast	6.7	FLIR / Insight - 74900499			No	Instruments	1	2/19/2019		
2019012214.4	TAT USA 13 Pad	1/21/2019	10:31:00	11:51:00	9	Overcast	6.7	FLIR / Insight - 74900499			No	Instruments	1	1/29/2019		
2019012214.4	TAT USA 13 Pad	1/21/2019	10:31:00	11:51:00	9	Overcast	6.7	FLIR / Insight - 74900499			No	Pressure Relief Devices	1	1/24/2019		
2019012214.4	TAT USA 13 Pad	1/21/2019	10:31:00	11:51:00	9	Overcast	6.7	FLIR / Insight - 74900499			No	Thief hatches or other openings on a controlled storage vessel	1	2/19/2019		
2019012215.1	Ness USA CTB	1/21/2019	15:48:00	16:37:00	10	Overcast	6.6	FLIR / Insight - 74900499			No	Pressure Relief Devices	1	1/24/2019		
2019012215.1	Ness USA CTB	1/21/2019	15:48:00	16:37:00	10	Overcast	6.6	FLIR / Insight - 74900499			No		0	2/20/2019		

Facility Record No	Identification of Each Affected Facility	Date of Survey	Survey Begin Time	Survey End Time	Ambient Temperature During Survey	Sky Conditions During Survey	Maximum Wind Speed During Survey	Monitoring Instrument Used	2nd Monitoring Instrument Used	Name of Surveyor	Deviations From Monitoring Plan If none State none	Type of Component for which Fugitive Emissions Detected	Number of Each Component for Which Fugitive Emissions Detected	Date of Successful Repair of Fugitive Emissions Component	Type of Instrument Used to Resurvey Components Not Repaired During Original Survey	Reason For Delay of Repair
201901242.1	Clara USA Pad	1/21/2019	11:58:00	13:32:00	9	Overcast	8	FLIR / Insight - 74900499		(b) (6) [redacted]	No	Thief hatches or other openings on a controlled storage vessel	1	1/24/2019		
201901242.1	Clara USA Pad	1/21/2019	11:55:00	13:32:00	9	Overcast	8	FLIR / Insight - 74900499		[redacted]	No	Thief hatches or other openings on a controlled storage vessel	1	1/24/2019		
201901242.1	Clara USA Pad	1/21/2019	11:55:00	13:32:00	9	Overcast	6	FLIR / Insight - 74900499		[redacted]	No	Thief hatches or other openings on a controlled storage vessel	1	1/24/2019		
201901242.1	Clara USA Pad	1/21/2019	11:55:00	13:32:00	9	Overcast	8	FLIR / Insight - 74900499		[redacted]	No	Thief hatches or other openings on a controlled storage vessel	1	1/24/2019		
201901242.1	Clara USA Pad	1/21/2019	11:55:00	13:32:00	9	Overcast	8	FLIR / Insight - 74900499		[redacted]	No	Thief hatches or other openings on a controlled storage vessel	1	1/21/2019		
201901241.1	Jones USA Pad	1/23/2019	16:02:00	16:57:00	23	Overcast	23	FLIR / Insight - 74900499		[redacted]	No	Thief hatches or other openings on a controlled storage vessel	1	2/20/2019		
201901245.1	Shobe USA Pad	1/21/2019	14:37:00	15:20:00	10	Overcast	4.2	FLIR / Insight - 74900499		[redacted]	No	Thief hatches or other openings on a controlled storage vessel	1	1/24/2019		
201901317.0	Ringer Pad	1/31/2019	07:23:00	09:30:00	8	Partly Cloudy	7	FLIR / BK 2 - 4440657		[redacted]	No	Thief hatches or other openings on a controlled storage vessel	1	2/14/2019	FLIR / Bakken 2 - 44400657	
201901317.0	Ringer Pad	1/31/2019	07:23:00	09:30:00	8	Partly Cloudy	7	FLIR / BK 2 - 4440657		[redacted]	No	Thief hatches or other openings on a controlled storage vessel	1	2/14/2019	FLIR / Bakken 2 - 44400657	
2019022112.1	Debbie Baklenko USA 12-26H	2/21/2019	09:40:00	11:00:00	1	Partly Cloudy	2	FLIR / Insight - 44401177		[redacted]	No	Thief hatches or other openings on a controlled storage vessel	1	3/26/2019		Repair could not be verified, well was down for ESP installation.
2019022112.1	Debbie Baklenko USA 12-26H	2/21/2019	09:40:00	11:00:00	1	Partly Cloudy	2	FLIR / Insight - 44401177		[redacted]	No	Connectors	1	2/21/2019		
2019022112.1	Debbie Baklenko USA 12-26H	2/21/2019	09:40:00	11:00:00	1	Partly Cloudy	2	FLIR / Insight - 44401177		[redacted]	No	Connectors	1	2/21/2019		
2019022814.1	Annie USA Pad	2/26/2019	12:18:00	12:14:00	1	Sunny	17.6	FLIR / Insight - 44401177		[redacted]	No	Thief hatches or other openings on a controlled storage vessel	1	3/15/2019		

AppendixG - Fugitive Emissions Components Monitoring Surveys

Facility Record No	Identification of Each Affected Facility	Date of Survey	Survey Begin Time	Survey End Time	Ambient Temperature During Survey	Sky Conditions During Survey	Maximum Wind Speed During Survey	Monitoring Instrument Used	2nd Monitoring Instrument Used	Name of Surveyor	Deviations From Monitoring Plan If none State none	Type of Component for which Fugitive Emissions Detected	Number of Each Component for Which Fugitive Emissions Detected	Date of Successful Repair of Fugitive Emissions Component	Type of Instrument Used to Resurvey Components Not Repaired During Original Survey	Reason For Delay of Repair
2019022815.1	Joanne Quale USA Pad	2/26/2019	13:20:00	14:06:00	4	Sunny	16.2	FLIR / Insight - 44401177		(b) (6) [redacted]	No	Thief hatches or other openings on a controlled storage vessel	1	3/15/2019		
201903013.1	Irish Pad	2/26/2019	14:09:00	15:03:00	6	Sunny	19.6	FLIR / Insight - 44401177			No	Thief hatches or other openings on a controlled storage vessel	1	3/15/2019		
201903013.1	Irish Pad	2/26/2019	14:09:00	15:03:00	6	Sunny	19.6	FLIR / Insight - 44401177			No	Thief hatches or other openings on a controlled storage vessel	1	3/15/2019		
201904047.1	Howard USA Pad	4/3/2019	12:41:00	13:45:00	34	Partly Cloudy	15.6	FLIR / Insight - 44401177			No	Pressure Relief Devices	1	4/5/2019		
201904047.1	Howard USA Pad	4/3/2019	12:41:00	13:45:00	34	Partly Cloudy	15.6	FLIR / Insight - 44401177			No	Valves	1	4/8/2019		
2019042624.0	William Kukla Pad	4/26/2019	11:10:00	11:45:00	54	Overcast	9	FLIR / BK 2 - 4440657			No	Thief hatches or other openings on a controlled storage vessel	1	4/26/2019		
2019042624.0	William Kukla Pad	4/26/2019	11:10:00	11:45:00	54	Overcast	9	FLIR / BK 2 - 4440657			No	Thief hatches or other openings on a controlled storage vessel	1	9/11/2019	FLIR / Bakken 2 - 44400657	Required Shut-in for dump-valve rekit and flame arrester swap.
201905084.0	Wm & Agnes Scott Pad	5/8/2019	07:15:00	07:35:00	38	Overcast	6	FLIR / BK 2 - 4440657			No	Pressure Relief Devices	1	5/9/2019		
201905084.0	Wm & Agnes Scott Pad	5/8/2019	07:15:00	07:35:00	38	Overcast	6	FLIR / BK 2 - 4440657			No	Pressure Relief Devices	1	5/8/2019		
2019051321.0	Tescher 11-27H Pad	5/13/2019	11:55:00	12:27:00	73	Overcast	10	FLIR / BK 2 - 4440657			No	Connectors	1	5/13/2019		
2019051321.0	Tescher 11-27H Pad	5/13/2019	11:55:00	12:27:00	73	Overcast	10	FLIR / BK 2 - 4440657			No	Connectors	1	7/27/2019		Unsafe to repair during operation. Required Shut-in to repair vent-line victolic clamp .
2019051724.0	TAT USA 34 Pad	5/13/2019	11:00:00	11:30:00	68	Sunny	7	FLIR / BK 1 - 4402088			No	Thief hatches or other openings on a controlled storage vessel	1	5/13/2019		
2019052918.0	Fred Hansen Pad	5/29/2019	11:15:00	11:48:00	69	Overcast	10	FLIR / BK 2 - 4440657			No		0	5/30/2019		
2019052921.0	Mary Hansen Pad	5/29/2019	12:30:00	12:45:00	73	Overcast	10	FLIR / BK 2 - 4440657			No	Pressure Relief Devices	1	5/30/2019		
2019052921.0	Mary Hansen Pad	5/29/2019	12:30:00	12:45:00	73	Overcast	10	FLIR / BK 2 - 4440657			No	Pressure Relief Devices	1	5/29/2019		
201906105.0	State Kreiger Pad	6/10/2019	23:00:00	11:45:00	69	Partly Cloudy		FLIR / BK 2 - 4440657			No	Thief hatches or other openings on a controlled storage vessel	1	6/11/2019		
201906105.0	State Kreiger Pad	6/10/2019	23:00:00	11:45:00	69	Partly Cloudy		FLIR / BK 2 - 4440657			No	Thief hatches or other openings on a controlled storage vessel	1	9/10/2019	FLIR / Bakken 2 - 44400657	Comunication error on workorder system.

Facility Record No	Identification of Each Affected Facility	Date of Survey	Survey Begin Time	Survey End Time	Ambient Temperature During Survey	Sky Conditions During Survey	Maximum Wind Speed During Survey	Monitoring Instrument Used	2nd Monitoring Instrument Used	Name of Surveyor	Deviations From Monitoring Plan If none State none	Type of Component for which Fugitive Emissions Detected	Number of Each Component for Which Fugitive Emissions Detected	Date of Successful Repair of Fugitive Emissions Component	Type of Instrument Used to Resurvey Components Not Repaired During Original Survey	Reason For Delay of Repair
201906105.0	State Kreiger Pad	6/10/2019	23:00:00	11:45:00	69	Partly Cloudy		FLIR / BK 2 - 4440657		(b) (6) [redacted]	No	Thief hatches or other openings on a controlled storage vessel	1	6/11/2019		
2019061032.0	Two Bar Pad	6/10/2019	11:50:00	12:30:00	69	Partly Cloudy	10	FLIR / BK 2 - 4440657			No	Thief hatches or other openings on a controlled storage vessel	1	6/11/2019		
2019061032.0	Two Bar Pad	6/10/2019	11:50:00	12:30:00	69	Partly Cloudy	10	FLIR / BK 2 - 4440657			No	Thief hatches or other openings on a controlled storage vessel	1	6/27/2019		
2019061032.0	Two Bar Pad	6/10/2019	11:50:00	12:30:00	69	Partly Cloudy	10	FLIR / BK 2 - 4440657			No	Thief hatches or other openings on a controlled storage vessel	1	6/11/2019		
2019061032.0	Two Bar Pad	6/10/2019	11:50:00	12:30:00	69	Partly Cloudy	10	FLIR / BK 2 - 4440657			No	Instruments	1	9/13/2019	FLIR / Bakken 2 - 44400657	Required Shut-in to repair connectors on 3 gas regulators
2019061032.0	Two Bar Pad	6/10/2019	11:50:00	12:30:00	69	Partly Cloudy	10	FLIR / BK 2 - 4440657			No	Instruments	1	7/31/2019		Required Shut-in to repair connector on gas regulator.
2019061135.0	Baker USA Pad	6/10/2019	10:24:00	11:55:00	64	Sunny	4.6	FLIR / Insight - 44401177			No	Flanges	1	6/17/2019		
2019061135.0	Baker USA Pad	6/10/2019	10:24:00	11:55:00	64	Sunny	4.6	FLIR / Insight - 44401177			No	Thief hatches or other openings on a controlled storage vessel	1	6/11/2019		
201906127.0	Burshia USA Pad	6/10/2019	11:58:00	14:34:00	68	Partly Cloudy	7.8	FLIR / Insight - 44401177			No	Thief hatches or other openings on a controlled storage vessel	1	6/12/2019		
201906127.0	Burshia USA Pad	6/10/2019	11:58:00	14:34:00	68	Partly Cloudy	7.8	FLIR / Insight - 44401177			No	Connectors	1	7/12/2019		Unsafe to repair during operation. Required Shut-in to repair vent-line
201906127.0	Burshia USA Pad	6/10/2019	11:58:00	14:34:00	68	Partly Cloudy	7.8	FLIR / Insight - 44401177			No	Connectors	1	6/17/2019		
201906127.0	Burshia USA Pad	6/10/2019	11:58:00	14:34:00	68	Partly Cloudy	7.8	FLIR / Insight - 44401177			No	Instruments	1	6/17/2019		
201906175.0	Pelton Pad	6/17/2019	10:50:00	11:32:00	57	Overcast	6	FLIR / BK 2 - 4440657			No	Thief hatches or other openings on a controlled storage vessel	1	6/18/2019		
201906175.0	Pelton Pad	6/17/2019	10:50:00	11:32:00	57	Overcast	6	FLIR / BK 2 - 4440657			No	Thief hatches or other openings on a controlled storage vessel	1	6/17/2019		
201906178.0	Darcy / Evelyn-Patrick Pad	6/17/2019	12:05:00	12:37:00	62	Overcast	6	FLIR / BK 2 - 4440657			No	Instruments	1	6/17/2019		

Facility Record No	Identification of Each Affected Facility	Date of Survey	Survey Begin Time	Survey End Time	Ambient Temperature During Survey	Sky Conditions During Survey	Maximum Wind Speed During Survey	Monitoring Instrument Used	2nd Monitoring Instrument Used	Name of Surveyor	Deviations From Monitoring Plan If none State none	Type of Component for which Fugitive Emissions Detected	Number of Each Component for Which Fugitive Emissions Detected	Date of Successful Repair of Fugitive Emissions Component	Type of Instrument Used to Resurvey Components Not Repaired During Original Survey	Reason For Delay of Repair
2019061827.0	Trotter Pad	6/18/2019	09:35:00	09:57:00	67	Partly Cloudy	6	FLIR / BK 2 - 4440657		(b) (6) [redacted]	No	Thief hatches or other openings on a controlled storage vessel	1	6/18/2019		
2019061827.0	Trotter Pad	6/18/2019	09:35:00	09:57:00	67	Partly Cloudy	6	FLIR / BK 2 - 4440657		[redacted]	No	Thief hatches or other openings on a controlled storage vessel	1	6/19/2019		
2019061847.0	Arthur Pad	6/18/2019	12:10:00	13:00:00	72	Partly Cloudy	9	FLIR / BK 2 - 4440657		[redacted]	No	Connectors	1	6/18/2019		
2019061847.0	Arthur Pad	6/18/2019	12:10:00	13:00:00	72	Partly Cloudy	9	FLIR / BK 2 - 4440657		[redacted]	No	Connectors	1	8/27/2019	FLIR / Bakken 2 - 44400657	Required Shut-in to repair connector on gas regulator.
2019061911.0	Hugo Pad	6/19/2019	09:14:00	10:17:00	59	Overcast	14	FLIR / BK 2 - 4440657		[redacted]	No	Pressure Relief Devices	1	6/20/2019		
2019061917.0	Chapman	6/19/2019	11:09:00	11:37:00	59	Overcast	14	FLIR / BK 2 - 4440657		[redacted]	No	Instruments	1	6/19/2019		
2019061917.0	Chapman	6/19/2019	11:09:00	11:37:00	59	Overcast	14	FLIR / BK 2 - 4440657		[redacted]	No	Instruments	1	9/13/2019	FLIR / Bakken 2 - 44400657	Required Shut-in to repair connector on gas regulator.
2019061920.0	Bethol CTB	6/19/2019	12:07:00	12:55:00		Overcast	14	FLIR / BK 2 - 4440657		[redacted]	No	Thief hatches or other openings on a controlled storage vessel	1	6/19/2019		
2019061920.0	Bethol CTB	6/19/2019	12:07:00	12:55:00		Overcast	14	FLIR / BK 2 - 4440657		[redacted]	No	Thief hatches or other openings on a controlled storage vessel	1	6/19/2019		
2019061920.0	Bethol CTB	6/19/2019	12:07:00	12:55:00		Overcast	14	FLIR / BK 2 - 4440657		[redacted]	No	Instruments	1	6/19/2019		
2019061920.0	Bethol CTB	6/19/2019	12:07:00	12:55:00		Overcast	14	FLIR / BK 2 - 4440657		[redacted]	No	Instruments	1	8/21/2019		Required Shut-in to repair connector on gas regulator.
2019061920.0	Bethol CTB	6/19/2019	12:07:00	12:55:00		Overcast	14	FLIR / BK 2 - 4440657		[redacted]	No	Pressure Relief Devices	1	6/19/2019		
2019061920.0	Bethol CTB	6/19/2019	12:07:00	12:55:00		Overcast	14	FLIR / BK 2 - 4440657		[redacted]	No	Pressure Relief Devices	1	8/21/2019		Required Shut-in to repair connector Pressure Relief Devices.
2019062518.0	Bingo Pad	6/24/2019	09:10:00	09:30:00	65	Sunny	2	FLIR / BK 1 - 4402088		[redacted]	No	Thief hatches or other openings on a controlled storage vessel	1	6/25/2019		
2019062519.0	Ness USA CTB	6/24/2019	09:45:00	10:05:00	69	Sunny	2	FLIR / BK 1 - 4402088		[redacted]	No	Thief hatches or other openings on a controlled storage vessel	1	6/25/2019		
2019062632.0	Stohler 41 Pad	6/26/2019	12:15:00	12:59:00	77	Partly Cloudy	4	FLIR / BK 2 - 4440657		[redacted]	No	Thief hatches or other openings on a controlled storage vessel	1	6/27/2019		

ApppendixG - Fugitive Emissions Components Monitoring Surveys

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2019062632.0	Stohler 41 Pad	6/26/2019	12:15:00	12:59:00	77	Partly Cloudy	4	FLIR / BK 2 - 4440657		(b) (6) [redacted]	No	Instruments	1	8/22/2019		Required Shut-in to repair connector on gas regulator.
2019062632.0	Stohler 41 Pad	6/26/2019	12:15:00	12:59:00	77	Partly Cloudy	4	FLIR / BK 2 - 4440657		[redacted]	No	Thief hatches or other openings on a controlled storage vessel	1	6/27/2010		
2019062632.0	Stohler 41 Pad	6/26/2019	12:15:00	12:59:00	77	Partly Cloudy	4	FLIR / BK 2 - 4440657		[redacted]	No	Instruments	1	6/27/2019		
2019062632.0	Stohler 41 Pad	6/26/2019	12:15:00	12:59:00	77	Partly Cloudy	4	FLIR / BK 2 - 4440657		[redacted]	No	Instruments	1	9/13/2019	FLIR / Bakken 2 - 44400657	Required Shut-in to repair connector on gas regulator.
2019062632.0	Stohler 41 Pad	6/26/2019	12:15:00	12:59:00	77	Partly Cloudy	4	FLIR / BK 2 - 4440657		[redacted]	No	Pressure Relief Devices	1	6/27/2019		
2019062632.0	Stohler 41 Pad	6/26/2019	12:15:00	12:59:00	77	Partly Cloudy	4	FLIR / BK 2 - 4440657		[redacted]	No	Pressure Relief Devices	1	6/27/2019		
2019062741.0	Raymond USA Pad	6/26/2019	12:50:00	13:15:00	80	Sunny	5	FLIR / BK 1 - 4402088		[redacted]	No	Thief hatches or other openings on a controlled storage vessel	1	7/2/2019		
2019062742.0	Goldberg USA Pad	6/26/2019	13:32:00	13:50:00	80	Sunny	5	FLIR / BK 1 - 4402088		[redacted]	No	Thief hatches or other openings on a controlled storage vessel	1	7/1/2019		
2019062743.0	Axell Pad	6/26/2019	14:00:00	15:15:00	80	Sunny	5	FLIR / BK 1 - 4402088		[redacted]	No	Thief hatches or other openings on a controlled storage vessel	1	7/1/2019		
2019062743.0	Axell Pad	6/26/2019	14:00:00	15:15:00	80	Sunny	5	FLIR / BK 1 - 4402088		[redacted]	No	Thief hatches or other openings on a controlled storage vessel	1	7/1/2019		
2019062744.0	Shobe USA Pad	6/26/2019	14:10:00	14:45:00	82	Sunny	5	FLIR / BK 1 - 4402088		[redacted]	No	Thief hatches or other openings on a controlled storage vessel	1	7/1/2019		
2019062744.0	Shobe USA Pad	6/26/2019	14:10:00	14:45:00	82	Sunny	5	FLIR / BK 1 - 4402088		[redacted]	No	Thief hatches or other openings on a controlled storage vessel	1	7/1/2019		
2019062833.0	Kempf Trust Pad	6/28/2019	10:55:00	11:32:00	75	Partly Cloudy	11	FLIR / BK 2 - 4440657		[redacted]	No	Thief hatches or other openings on a controlled storage vessel	1	6/28/2019		
2019062833.0	Kempf Trust Pad	6/28/2019	10:55:00	11:32:00	75	Partly Cloudy	11	FLIR / BK 2 - 4440657		[redacted]	No	Thief hatches or other openings on a controlled storage vessel	1	6/28/2019		
2019062833.0	Kempf Trust Pad	6/28/2019	10:55:00	11:32:00	75	Partly Cloudy	11	FLIR / BK 2 - 4440657		[redacted]	No	Thief hatches or other openings on a controlled storage vessel	1	6/28/2019		

ApppendixG - Fugitive Emissions Components Monitoring Surveys

Facility Record No.	Identification of Each Affected Facility	Date of Survey	Survey Begin Time	Survey End Time	Ambient Temperature During Survey	Sky Conditions During Survey	Maximum Wind Speed During Survey	Monitoring Instrument Used	2nd Monitoring Instrument Used	Name of Surveyor	Deviations From Monitoring Plan If none State none	Type of Component for which Fugitive Emissions Detected	Number of Each Component for Which Fugitive Emissions Detected	Date of Successful Repair of Fugitive Emissions Component	Type of Instrument Used to Resurvey Components Not Repaired During Original Survey	Reason For Delay of Repair
2019062833.0	Kempf Trust Pad	6/28/2019	10:55:00	11:32:00	75	Partly Cloudy	11	FLIR / BK 2 - 4440657		(b) (6) [redacted]	No	Thief hatches or other openings on a controlled storage vessel	1	7/26/2019		
2019070312.0	Lars Pad	7/3/2019	08:25:00	08:59:00	61	Overcast	9	FLIR / BK 2 - 4440657			No	Thief hatches or other openings on a controlled storage vessel	1	7/4/2019		
2019070312.0	Lars Pad	7/3/2019	08:25:00	08:59:00	61	Overcast	9	FLIR / BK 2 - 4440657			No	Thief hatches or other openings on a controlled storage vessel	1	7/3/2019		
2019070911.0	Marlin 14 Pad	7/9/2019	06:43:00	07:08:00	62	Overcast	11	FLIR / BK 2 - 4440657			No	Pressure Relief Devices	1	7/27/2019	FLIR / Bakken 1 - 44402088	
2019070911.0	Marlin 14 Pad	7/9/2019	06:43:00	07:08:00	62	Overcast	11	FLIR / BK 2 - 4440657			No	Pressure Relief Devices	1	7/10/2019		

Appendix H- Certification signed by the qualified professional engineer for each closed vent system routing to a control device.

ARTHUR CTB VENT LINE DESIGN AND CAPACITY ASSESSMENT

TO:	Marathon Oil	(b) (6) [redacted]
FROM:	Dylan Fortin, Will Myers	
CC:	Jeff Wellen	
DATE:	January 25, 2019	
RE:	Arthur CTB - Vent Line Design and Capacity Assessment Rev 0	

The US EPA finalized "Standards of Performance for Crude Oil and Natural Gas Facilities for which Construction, Modification or Reconstruction Commenced After September 18, 2015" on June 3, 2016. This regulation has requirements for certifying the design of closed vent systems. An assessment of the closed vent must be performed to determine it is of sufficient design and capacity to ensure that all emissions from storage vessels are routed to the control device or process and have it certified by a qualified professional engineer. This regulation is 40 CFR 60 Subpart OOOOa, referred to as the OOOOa regulation.

Certification for 40 CFR 60.5411a(d):

"I certify that the closed vent system design and capacity assessment was prepared under my direction or supervision. I further certify that the closed vent system design and capacity assessment was conducted and this report was prepared pursuant to the requirements of subpart OOOOa of 40 CFR part 60. Based on my professional knowledge and experience, and inquiry of personnel involved in the assessment, the certification submitted herein is true, accurate, and complete. I am aware that there are penalties for knowingly submitting false information."

Purpose:

Evaluate the new Arthur CTB vent line design to ensure that the Enardo ES-660 thief hatches, which are set at 16 oz/in^2, will not open during normal operating flow rate scenarios. The normal flow path for the vapor from the storage tanks will be to one flare where the off gas will be combusted to meet OOOOa regulations.

Results:

Based on the vent system in the Arthur CTB Rev 0 3D model (transmitted January 16, 2019) and predicted vapor flow rates, Halker Consulting evaluated the pipe routing from the storage tanks to the flare and calculated the expected pressure drop in the system during the Marathon Oil specified maximum predicted vapor flow rates. The pressure at the outlet of the flare was set at local atmospheric pressure of 13.7 psia. Pressure drop through the piping system from the furthest storage tank to the flare was calculated and found to have a backpressure on the tank battery of 0.7 oz/in^{2}g.

During normal operating conditions the 0.7 oz/in^{2}g pressure should be the highest pressure that the tanks will see and the Enardo thief hatches will not open.

Calculations:

A flare tip pressure drop of 0.0 oz/in² was used and was based on information provided by Steffes Flare systems for the Air Assist Model 4. The flame arrestor pressure drop used was 0.100 oz/in² and is based on the Enardo sizing program for a 6" Series 8 inline flame arrestor.

The total gas flow rate to the flare used was 154 Mscfd and is based on a condensate flash factor and gas composition provided by Marathon Oil. The gas composition used was the average composition from the February 2017 Clarks Creek (MM) Analysis Summary. Credit was taken for the VRT thereby reducing the amount of flashed gas that was calculated using the provided flash gas factor.

Using the same calculation methodology, the total gas flow rate can be increased to approximately 769 Mscfd and stay at or below the opening pressure of an Enardo ES-660 thief hatch (14.4 oz/in²). This is approximately 4.99 times the normal operating flow. The crack pressure of the Enardo ES-660's was assumed to be 90% of the set pressure based on review of the device product data sheet.

Standard pressure drop "K" value for fittings and valves per Crane Technical Paper 410 were used. The value used for the absolute roughness of steel was 0.00015 ft.

**Attached are the tabulated results of the hydraulic calculations*

Disclaimer:

This assessment meets the certification requirements of 40 CFR part 60 subpart 0000a. It is the responsibility of *Marathon Oil* to comply with the reporting requirements of this regulation.

This evaluation does not consider the destructive efficiency of the control device or components upstream of the tank vent design.

AXELL CTB VENT LINE DESIGN AND CAPACITY ASSESSMENT

TO:	Marathon Oil
FROM:	Dylan Fortin
CC:	Jeff Wellen
DATE:	June 22, 2018
RE:	Axell CTB - Vent Line Design and Capacity Assessment Rev 0 - IFI

(b) (6) [redacted]

The US EPA finalized "Standards of Performance for Crude Oil and Natural Gas Facilities for which Construction, Modification or Reconstruction Commenced After September 18, 2015" on June 3, 2016. This regulation has requirements for certifying the design of closed vent systems. An assessment of the closed vent must be performed to determine it is of sufficient design and capacity to ensure that all emissions from storage vessels are routed to the control device or process and have it certified by a qualified professional engineer. This regulation is 40 CFR 60 Subpart OOOOa, referred to as the Quad Oa regulation.

Certification for 40 CFR 60.5411a(d):

"I certify that the closed vent system design and capacity assessment was prepared under my direction or supervision. I further certify that the closed vent system design and capacity assessment was conducted and this report was prepared pursuant to the requirements of subpart OOOOa of 40 CFR part 60. Based on my professional knowledge and experience, and inquiry of personnel involved in the assessment, the certification submitted herein is true, accurate, and complete. I am aware that there are penalties for knowingly submitting false information."

Purpose:

Evaluate the new Axell CTB vent line design to ensure that the Enardo ES-660 thief hatches, which are set at 16 oz/in^2, will not open during normal operating flow rate scenarios. Axell CTB consists of a bulk and test facility (Axell) and a section line facility (Sibyl). Each facility has its own vent line upstream of the flare scrubbers. Both facility vent lines commingle downstream of the flare scrubbers prior to being combusted by one low pressure flare to meet Quad Oa regulations.

Results:

Based on the vent system 3D model (dated 6/19/2018) and predicted vapor flow rates, Halker Consulting evaluated the pipe routing from the storage tanks to the flare and calculated the expected pressure drop in the system during the Marathon Oil specified predicted vapor flow rates. The pressure at the outlet of the flares was set at local atmospheric pressure of 13.7 psia. Since Axell CTB consists of two separate tank batteries which are commingled, two different tank battery pressures were calculated. For normal predicted peak flow rate scenarios (Attachment 1), the calculated pressures at the farthest tank from the flares for the Axell and Sibyl tank batteries are 4.8 and 3.7 osig respectively.

Calculations:

A flare tip pressure drop of 0.0 oz/in^2 was used and was based on information provided by Steffes Flare systems for the Air Assist Model 4. The flame arrestor pressure drop used was 1.4 oz/in^2 and is based on the Enardo sizing program for a 4" Series 8 inline flame arrestor.

The gas flow rate from the Axell and Sibyl facilities were 160 and 200 Mscfd (360 Mscfd total gas flow rate commingled downstream of scrubbers), respectively. The gas flow rate was based on a condensate flash factor and gas composition provided by Marathon Oil. The gas composition used was the average composition from the February 2017 Clarks Creek (MM) Analysis Summary. Credit was taken for the Axell VRT, thereby reducing the amount of flashed gas that was calculated using the provided flash gas factor.

Using the same calculation methodology, the total allowable gas flow rates were calculated such that the tank pressures remain below the opening pressure of an Enardo ES-660 thief hatch (14.4 oz/in^2). The maximum allowable flow rates are reported below and assume the other facility flow rate remains constant as predicted.

Facility Scenario	Flow Rate [Mscfd]	% Greater than Predicted Peak
Axell Maximum Allowable	350	219%
Sibyl Maximum Allowable	514	257%

Standard pressure drop "K" value for fittings and valves per Crane Technical Paper No. 410 were used. The value used for the absolute roughness of steel was 0.00015 ft.

**Attached are the tabulated results of the hydraulic calculations*

Disclaimer:

This assessment meets the certification requirements of 40 CFR part 60 subpart 0000a. It is the responsibility of *Marathon Oil* to comply with the reporting requirements of this regulation.

This evaluation does not consider the destructive efficiency of the control device or components upstream of the tank vent design.

BAKER CTB VENT LINE DESIGN AND CAPACITY ASSESSMENT

TO:	Marathon Oil	(b) (6) [redacted]
FROM:	KC Agwu, Dylan Fortin	
CC:	Jeff Wellen	
DATE:	December 4, 2018	
RE:	Baker CTB - Vent Line Design and Capacity Assessment, Rev 0	

The US EPA finalized "Standards of Performance for Crude Oil and Natural Gas Facilities for which Construction, Modification or Reconstruction Commenced After September 18, 2015" on June 3, 2016. This regulation has requirements for certifying the design of closed vent systems. An assessment of the closed vent must be performed to determine it is of sufficient design and capacity to ensure that all emissions from storage vessels are routed to the control device or process and have it certified by a qualified professional engineer. This regulation is 40 CFR 60 Subpart OOOOa, referred to as the OOOOa regulation.

Certification for 40 CFR 60.5411a(d):

"I certify that the closed vent system design and capacity assessment was prepared under my direction or supervision. I further certify that the closed vent system design and capacity assessment was conducted and this report was prepared pursuant to the requirements of subpart OOOOa of 40 CFR part 60. Based on my professional knowledge and experience, and inquiry of personnel involved in the assessment, the certification submitted herein is true, accurate, and complete. I am aware that there are penalties for knowingly submitting false information."

Purpose:

Evaluate the new Baker CTB vent line design to ensure that the Enardo ES-660 thief hatches, which are set at 16 oz/in^2, will not open during normal operating flow rate scenarios. The normal flow path for the vapor from the storage tanks will be to one flare where the off gas will be combusted to meet OOOOa regulations.

Results:

Based on the vent system in the Baker CTB Rev 0 3D model, (transmitted on November 28, 2018), and the predicted vapor flow rates, Halker Consulting evaluated the pipe routing from the storage tanks to the flare and calculated the expected pressure drop in the system during the Marathon Oil specified maximum predicted vapor flow rates. The pressure at the outlet of the flare was set at local atmospheric pressure of 13.7 psia. Pressure drop through the piping system from the furthest storage tank to the flare was calculated and found to have a backpressure on the tank battery of 2.0 oz/in^{2}g.

During normal operating conditions 2.0 oz/in^{2}g pressure is the highest pressure that the tanks will see and the Enardo thief hatches will not open.

Calculations:

A flare tip pressure drop of 0.0 oz/in² was used and was based on information provided by Steffes Flare systems for the Air Assist Model 4. The flame arrestor pressure drop used was 0.372 oz/in² and is based on the Enardo sizing program for a 4" Series 8 inline flame arrestor.

The total gas flow rate to the flare used was 140 Mscfd and is based on a condensate flash factor and gas composition provided by Marathon Oil. The gas composition used was the average composition from the February 2017 Clarks Creek (MM) Analysis Summary. Credit was taken for the VRT thereby reducing the amount of flashed gas that was calculated using the provided flash gas factor.

Using the same calculation methodology, the total gas flow rate can be increased to approximately 416 Mscfd and stay at or below the opening pressure of an Enardo ES-660 thief hatch (14.4 oz/in²). This is approximately 2.97 times the normal operating flow. The crack pressure of the Enardo ES-660's were assumed to be 90% of the set pressure based on review of the device product data sheet.

Standard pressure drop "K" value for fittings and valves per Crane Technical Paper 410 were used. The value used for the absolute roughness of steel was 0.00015 ft.

**Attached are the tabulated results of the hydraulic calculations*

Disclaimer:

This assessment meets the certification requirements of 40 CFR part 60 subpart 0000a. It is the responsibility of *Marathon Oil* to comply with the reporting requirements of this regulation.

This evaluation does not consider the destructive efficiency of the control device or components upstream of the tank vent design.

BARBER CTB VENT LINE DESIGN AND CAPACITY ASSESSMENT

TO:	Marathon Oil	(b) (6) [redacted]
FROM:	Dylan Fortin	
CC:	Jeff Wellen	
DATE:	April 27, 2017	
RE:	Barber CTB - Vent Line Design and Capacity Assessment	

The US EPA finalized "Standards of Performance for Crude Oil and Natural Gas Facilities for which Construction, Modification or Reconstruction Commenced After September 18, 2015" on June 3, 2016. This regulation has requirements for certifying the design of closed vent systems. An assessment of the closed vent must be performed to determine it is of sufficient design and capacity to ensure that all emissions from storage vessels are routed to the control device or process and have it certified by a qualified professional engineer. This regulation is 40 CFR 60 Subpart OOOOa, referred to as the Quad Oa regulation.

Certification for 40 CFR 60.5411a(d):

"I certify that the closed vent system design and capacity assessment was prepared under my direction or supervision. I further certify that the closed vent system design and capacity assessment was conducted and this report was prepared pursuant to the requirements of subpart OOOOa of 40 CFR part 60. Based on my professional knowledge and experience, and inquiry of personnel involved in the assessment, the certification submitted herein is true, accurate, and complete. I am aware that there are penalties for knowingly submitting false information."

Purpose:

Evaluate the new Barber CTB vent line design to ensure that the Enardo ES-660 thief hatches, which are set at 16 oz/in^2, will not open during normal operating flow rate scenarios. The normal flow path for the vapor from the storage tanks will be to one flare where the off gas will be combusted to meet Quad Oa regulations.

Results:

Based on the vent system 3D model (dated 4/23/2018) and predicted vapor flow rates, Halker Consulting evaluated the pipe routing from the storage tanks to the flare and calculated the expected pressure drop in the system during the Marathon Oil specified maximum predicted vapor flow rates. The pressure at the outlet of the flare was set at local atmospheric pressure of 13.5 psia. Pressure drop through the piping system from the furthest storage tank to the flare was calculated and found to have a backpressure on the tank battery of 0.16 psig (2.5 oz/in^{2}g).

During normal operating conditions the 2.5 oz/in^{2}g pressure should be the highest pressure that the tanks will see and is 16 % of the of 16 oz/in^{2}g set pressure of the thief hatch.

Calculations:

A flare tip pressure drop of 0.0 oz/in^2 was used and was based on information provided by Steffes Flare systems for the Air Assist Model 4. The flame arrestor pressure drop used was 0.37 oz/in^2 and is based on the Enardo sizing program for a 4" Series 8 inline flame arrestor.

The total gas flow rate to the flare used was 160 Mscfd and is based on a condensate flash factor and gas composition provided by Marathon Oil. The gas composition used was the average composition from the February 2017 Clarks Creek (MM) Analysis Summary. Credit was taken for the VRT thereby reducing the amount of flashed gas that was calculated using the provided flash gas factor.

Using the same calculation methodology, the total gas flow rate can be increased to approximately 410 Mscfd and stay at or below the opening pressure of an Enardo ES-660 thief hatch (14.4 oz/in^2). This is approximately 2.5 times the normal operating flow.

Standard pressure drop "K" value for fittings and valves per Crane Technical Paper 410 were used. The value used for the absolute roughness of steel was 0.00015 ft.

**Attached are the tabulated results of the hydraulic calculations*

Disclaimer:

This assessment meets the certification requirements of 40 CFR 60 subpart 0000a. It is the responsibility of *Marathon Oil* to comply with the reporting requirements of this regulation.

This evaluation does not consider the destructive efficiency of the control device or components upstream of the tank vent design.

BURSHIA CTB VENT LINE DESIGN AND CAPACITY ASSESSMENT

PROFESSIO

(b) (6) [redacted]

TO:	Marathon Oil
FROM:	Nigel Wang, Dylan Fortin
CC:	Jeff Wellen
DATE:	December 4, 2018
RE:	Burshia CTB - Vent Line Design and Capacity Assessment, Rev 0

The US EPA finalized "Standards of Performance for Crude Oil and Natural Gas Facilities for which Construction, Modification or Reconstruction Commenced After September 18, 2015" on June 3, 2016. This regulation has requirements for certifying the design of closed vent systems. An assessment of the closed vent must be performed to determine it is of sufficient design and capacity to ensure that all emissions from storage vessels are routed to the control device or process and have it certified by a qualified professional engineer. This regulation is 40 CFR 60 Subpart OOOOa, referred to as the OOOOa regulation.

Certification for 40 CFR 60.5411a(d):

"I certify that the closed vent system design and capacity assessment was prepared under my direction or supervision. I further certify that the closed vent system design and capacity assessment was conducted and this report was prepared pursuant to the requirements of subpart OOOOa of 40 CFR part 60. Based on my professional knowledge and experience, and inquiry of personnel involved in the assessment, the certification submitted herein is true, accurate, and complete. I am aware that there are penalties for knowingly submitting false information."

Purpose:

Evaluate the new Burshia CTB vent line design to ensure that the Enardo ES-660 thief hatches, which are set at 16 oz/in², will not open during normal operating flow rate scenarios. The normal flow path for the vapor from the storage tanks will be to two flares where the off gas will be combusted to meet OOOOa regulations.

Results:

Based on the vent system in the Burshia CTB Rev 0 3D model (transmitted on November 29, 2018) and predicted vapor flow rates, Halker Consulting evaluated the pipe routing from the storage tanks to the flares and calculated the expected pressure drop in the system during the Marathon Oil specified maximum predicted vapor flow rates. The pressure at the outlet of each flare was set at local atmospheric pressure of 13.7 psia. Pressure drop through the piping system from the furthest storage tank to the flares was calculated and found to have a backpressure on the tank battery of 5.5 oz/in²g.

During normal operating conditions the 5.5 oz/in²g pressure should be the highest pressure that the tanks will see and the Enardo thief hatches will not open.

Calculations:

A flare tip pressure drop of 0.0 oz/in^2 was used and was based on information provided by Steffes Flare systems for the Air Assist Model 4. The flame arrestor pressure drop used was 0.345 oz/in^2 and is based on the Enardo sizing program for a 6" Series 8 inline flame arrestor.

The gas flow rate to each flare used was 350 Mscfd (total CTB rate of 700 Mscfd) and is based on a condensate flash factor and gas composition provided by Marathon Oil. The gas composition used was the average composition from the February 2017 Clarks Creek (MM) Analysis Summary.

Using the same calculation methodology, the total gas flow rate can be increased to approximately 1163 Mscfd and stay at or below the opening pressure of an Enardo ES-660 thief hatch (14.4 oz/in^2). This is approximately 1.66 times the normal operating flow. The crack pressure of the Enardo ES-660's were assumed to be 90% of the set pressure based on review of the device product data sheet.

Standard pressure drop "K" value for fittings and valves per Crane Technical Paper 410 were used. The value used for the absolute roughness of steel was 0.00015 ft.

**Attached are the tabulated results of the hydraulic calculations*

Disclaimer:

This assessment meets the certification requirements of 40 CFR part 60 subpart 0000a. It is the responsibility of *Marathon Oil* to comply with the reporting requirements of this regulation.

This evaluation does not consider the destructive efficiency of the control device or components upstream of the tank vent design.

CLARA CTB VENT LINE DESIGN AND CAPACITY ASSESSMENT

TO:	Marathon Oil
FROM:	Dylan Fortin
CC:	Jeff Wellen
DATE:	June 6, 2018
RE:	Clara CTB - Vent Line Design and Capacity Assessment Rev 0 - IFI

(b) (6) [redacted]

The US EPA finalized "Standards of Performance for Crude Oil and Natural Gas Facilities for which Construction, Modification or Reconstruction Commenced After September 18, 2015" on June 3, 2016. This regulation has requirements for certifying the design of closed vent systems. An assessment of the closed vent must be performed to determine it is of sufficient design and capacity to ensure that all emissions from storage vessels are routed to the control device or process and have it certified by a qualified professional engineer. This regulation is 40 CFR 60 Subpart OOOOa, referred to as the Quad Oa regulation.

Certification for 40 CFR 60.5411a(d):

"I certify that the closed vent system design and capacity assessment was prepared under my direction or supervision. I further certify that the closed vent system design and capacity assessment was conducted and this report was prepared pursuant to the requirements of subpart OOOOa of 40 CFR part 60. Based on my professional knowledge and experience, and inquiry of personnel involved in the assessment, the certification submitted herein is true, accurate, and complete. I am aware that there are penalties for knowingly submitting false information."

Purpose:

Evaluate the new Clara CTB vent line design to ensure that the Enardo ES-660 thief hatches, which are set at 16 oz/in^2, will not open during normal operating flow rate scenarios. Clara CTB consists of two separate bulk and test facilities. Each facility has its own vent line upstream of the flare scrubbers. Both facility vent lines commingle downstream of the flare scrubbers prior to being combusted by two flares to meet Quad Oa regulations.

Results:

Based on the vent system 3D model (dated 6/6/2018) and predicted vapor flow rates, Halker Consulting evaluated the pipe routing from the storage tanks to the flare and calculated the expected pressure drop in the system during the Marathon Oil specified predicted vapor flow rates. The pressure at the outlet of the flares was set at local atmospheric pressure of 13.7 psia. Since Clara CTB consists of two separate tank batteries which are commingled, two different tank battery pressures were calculated. For predicted peak flow rate scenarios the calculated pressures at the farthest tank from the flares for the Clara and Michelle tank batteries are 9.4 and 9.5 osig respectively.

Calculations:

A flare tip pressure drop of 0.0 oz/in^2 was used and was based on information provided by Steffes Flare systems for the Air Assist Model 4. The flame arrestor pressure drop used was 0.7 oz/in^2 and is based on the Enardo sizing program for a 6" Series 8 inline flame arrestor.

The gas flow rate from each of the two facilities was 550 Mscfd (1,100 Mscfd total gas flow rate commingled downstream of scrubbers). The gas flow rate was based on a condensate flash factor and gas composition provided by Marathon Oil. The gas composition used was the average composition from the February 2017 Clarks Creek (MM) Analysis Summary.

Using the same calculation methodology, the total allowable gas flow rates were calculated such that the tank pressures remain below the opening pressure of an Enardo ES-660 thief hatch (14.4 oz/in^2). The maximum allowable flow rates are reported below and assume the other facility flow rate remains constant as predicted.

Facility Scenario	Flow Rate [Mscfd]	% Greater than Predicted Peak
Michelle Maximum Allowable	760	138%
Clara Maximum Allowable	750	136%

Standard pressure drop "K" value for fittings and valves per Crane Technical Paper No. 410 were used. The value used for the absolute roughness of steel was 0.00015 ft.

**Attached are the tabulated results of the hydraulic calculations*

Disclaimer:

This assessment meets the certification requirements of 40 CFR part 60 subpart 0000a. It is the responsibility of *Marathon Oil* to comply with the reporting requirements of this regulation.

This evaluation does not consider the destructive efficiency of the control device or components upstream of the tank vent design.

STATE EGGERT CTB VENT LINE DESIGN AND CAPACITY ASSESSMENT

TO:	Marathon Oil	(b) (6) [redacted]
FROM:	Nigel Wang, Dylan Fortin	
CC:	Jeff Wellen	
DATE:	February 22, 2019	
RE:	State Eggert - Vent Line Design and Capacity Assessment Rev 0	

The US EPA finalized "Standards of Performance for Crude Oil and Natural Gas Facilities for which Construction, Modification or Reconstruction Commenced After September 18, 2015" on June 3, 2016. This regulation has requirements for certifying the design of closed vent systems. An assessment of the closed vent must be performed to determine it is of sufficient design and capacity to ensure that all emissions from storage vessels are routed to the control device or process and have it certified by a qualified professional engineer. This regulation is 40 CFR 60 Subpart OOOOa, referred to as the OOOOa regulation.

Certification for 40 CFR 60.5411a(d):

"I certify that the closed vent system design and capacity assessment was prepared under my direction or supervision. I further certify that the closed vent system design and capacity assessment was conducted and this report was prepared pursuant to the requirements of subpart OOOOa of 40 CFR part 60. Based on my professional knowledge and experience, and inquiry of personnel involved in the assessment, the certification submitted herein is true, accurate, and complete. I am aware that there are penalties for knowingly submitting false information."

Purpose:

Evaluate the new State Eggert CTB vent line design to ensure that the Enardo ES-660 thief hatches, which are set at 16 oz/in^2, will not open during normal operating flow rate scenarios. The normal flow path for the vapor from the storage tanks will be to one flare where the off gas will be combusted to meet OOOOa regulations.

Results:

Based on the vent system in the State Eggert Rev 0 3D model (transmitted February 22, 2019) and predicted vapor flow rates, Halker Consulting evaluated the pipe routing from the storage tanks to the flare and calculated the expected pressure drop in the system during the Marathon Oil specified maximum predicted vapor flow rate of 870 Mscfd during flowback. The pressure at the outlet of the flare was set at local atmospheric pressure of 13.7 psia. Pressure drop through the piping system from the furthest storage tank to the flare was calculated and found to have a backpressure on the tank battery of 9.1 oz/in^{2}g.

During normal operating conditions, 9.1 oz/in^{2}g pressure should be the highest pressure that the tanks will see and therefore the Enardo thief hatches will not open.

Calculations:

A flare tip pressure drop of 0.0 oz/in^2 was used and was based on information provided by Steffes Flare systems for the Air Assist Model 4. The flame arrestor pressure drop used was 2.55 oz/in^2 and is based on the Enardo sizing program for a 4" Series 8 inline flame arrestor.

The total gas flow rate to the flares used was 870 Mscfd and is based on a condensate flash factor and gas composition provided by Marathon Oil. The gas composition used was the average composition from the February 2017 Clarks Creek (MM) Analysis Summary.

Using the same calculation methodology, the total gas flow rate can be increased to approximately 1115 Mscfd and stay at or below the opening pressure of an Enardo ES-660 thief hatch (14.4 oz/in^2). This is approximately 1.28 times the normal operating flow. The crack pressure of the Enardo ES-660s was assumed to be 90% of the set pressure based on review of the device product data sheet.

Standard pressure drop "K" value for fittings and valves per Crane Technical Paper 410 were used. The value used for the absolute roughness of steel was 0.00015 ft.

**Attached are the tabulated results of the hydraulic calculations*

Disclaimer:

This assessment meets the certification requirements of 40 CFR part 60 subpart 0000a. It is the responsibility of *Marathon Oil* to comply with the reporting requirements of this regulation.

This evaluation does not consider the destructive efficiency of the control device or components upstream of the tank vent design.

HOWARD CTB VENT LINE DESIGN AND CAPACITY ASSESSMENT

TO:	Marathon Oil	(b) (6) [redacted]
FROM:	Nigel Wang, Dylan Fortin	
CC:	Jeff Wellen	
DATE:	October 26, 2018	
RE:	Howard CTB - Vent Line Design and Capacity Assessment, Rev 0	

The US EPA finalized "Standards of Performance for Crude Oil and Natural Gas Facilities for which Construction, Modification or Reconstruction Commenced After September 18, 2015" on June 3, 2016. This regulation has requirements for certifying the design of closed vent systems. An assessment of the closed vent must be performed to determine it is of sufficient design and capacity to ensure that all emissions from storage vessels are routed to the control device or process and have it certified by a qualified professional engineer. This regulation is 40 CFR 60 Subpart OOOOa, referred to as the OOOOa regulation.

Certification for 40 CFR 60.5411a(d):

"I certify that the closed vent system design and capacity assessment was prepared under my direction or supervision. I further certify that the closed vent system design and capacity assessment was conducted and this report was prepared pursuant to the requirements of subpart OOOOa of 40 CFR part 60. Based on my professional knowledge and experience, and inquiry of personnel involved in the assessment, the certification submitted herein is true, accurate, and complete. I am aware that there are penalties for knowingly submitting false information."

Purpose:

Evaluate the new Howard CTB vent line design to ensure that the Enardo ES-660 thief hatches, which are set at 16 oz/in^2, will not open during normal operating flow rate scenarios. The normal flow path for the vapor from the storage tanks will be to one flare where the off gas will be combusted to meet OOOOa regulations.

Results:

Based on the vent system in the Howard CTB Rev 0 3D model, (transmitted on October 12, 2018), and the predicted vapor flow rates, Halker Consulting evaluated the pipe routing from the storage tanks to the flare and calculated the expected pressure drop in the system during the Marathon Oil specified maximum predicted vapor flow rates. The pressure at the outlet of the flare was set at local atmospheric pressure of 13.7 psia. Pressure drop through the piping system from the furthest storage tank to the flare was calculated and found to have a backpressure on the tank battery of 2.3 oz/in^2g.

During normal operating conditions 2.3 oz/in^2g pressure is the highest pressure that the tanks will see and the Enardo thief hatches will not open.

Calculations:

A flare tip pressure drop of 0.0 oz/in² was used and was based on information provided by Steffes Flare systems for the Air Assist Model 4. The flame arrestor pressure drop used was 0.414 oz/in² and is based on the Enardo sizing program for a 4" Series 8 inline flame arrestor.

The total gas flow rate to the flare used was 150 Mscfd and is based on a condensate flash factor and gas composition provided by Marathon Oil. The gas composition used was the average composition from the February 2017 Clarks Creek (MM) Analysis Summary. Credit was taken for the VRT thereby reducing the amount of flashed gas that was calculated using the provided flash gas factor.

Using the same calculation methodology, the total gas flow rate can be increased to approximately 409 Mscfd and stay at or below the opening pressure of an Enardo ES-660 thief hatch (14.4 oz/in²). This is approximately 2.73 times the normal operating flow. The crack pressure of the Enardo ES-660s were assumed to be 90% of the set pressure based on review of the device product data sheet.

Standard pressure drop "K" value for fittings and valves per Crane Technical Paper 410 were used. The value used for the absolute roughness of steel was 0.00015 ft.

**Attached are the tabulated results of the hydraulic calculations*

Disclaimer:

This assessment meets the certification requirements of 40 CFR part 60 subpart 0000a. It is the responsibility of *Marathon Oil* to comply with the reporting requirements of this regulation.

This evaluation does not consider the destructive efficiency of the control device or components upstream of the tank vent design.

IRISH CTB VENT LINE DESIGN AND CAPACITY ASSESSMENT

(b) (6) [redacted]

TO:	Marathon Oil
FROM:	Nigel Wang, Dylan Fortin
CC:	Jeff Wellen
DATE:	September 21, 2018
RE:	Irish CTB - Vent Line Design and Capacity Assessment Rev 0

The US EPA finalized "Standards of Performance for Crude Oil and Natural Gas Facilities for which Construction, Modification or Reconstruction Commenced After September 18, 2015" on June 3, 2016. This regulation has requirements for certifying the design of closed vent systems. An assessment of the closed vent must be performed to determine it is of sufficient design and capacity to ensure that all emissions from storage vessels are routed to the control device or process and have it certified by a qualified professional engineer. This regulation is 40 CFR 60 Subpart OOOOa, referred to as the OOOOa regulation.

Certification for 40 CFR 60.5411a(d):

"I certify that the closed vent system design and capacity assessment was prepared under my direction or supervision. I further certify that the closed vent system design and capacity assessment was conducted and this report was prepared pursuant to the requirements of subpart OOOOa of 40 CFR part 60. Based on my professional knowledge and experience, and inquiry of personnel involved in the assessment, the certification submitted herein is true, accurate, and complete. I am aware that there are penalties for knowingly submitting false information."

Purpose:

Evaluate the new Irish CTB vent line design to ensure that the Enardo ES-660 thief hatches, which are set at 16 oz/in^2, will not open during normal operating flow rate scenarios. Irish CTB consists of of a bulk and test facility (Irish) and a section line facility (Gretchen). Each facility has its own tank battery, tank vent line, and flare scrubbers. Both facility vent lines commingle downstream of the flare scrubbers prior to being combusted by one low pressure flare to meet OOOOa regulations.

Results:

Based on the vent system 3D model (dated September 13, 2018) and predicted vapor flow rates, Halker Consulting evaluated the pipe routing from the storage tanks to the flare and calculated the expected pressure drop in the system during the Marathon Oil specified maximum predicted vapor flow rates. The pressure at the outlet of the flare was set at local atmospheric pressure of 13.7 psia. Since Irish consists of two separate tank batteries which are commingled, two different tank battery pressures were calculated. For normal predicted peak flow rate scenarios (Attachment 1), the calculated pressures at the farthest tank for the Irish and Gretchen tank batteries are 3.3 and 9.9 oz/in^{2}g respectively.

Calculations:

A flare tip pressure drop of 0.0 oz/in^2 was used and was based on information provided by Steffes Flare systems for the Air Assist Model 4. The flame arrestor pressure drop used was 0.596 oz/in^2 and is based on the Enardo sizing program for a 6" Series 8 inline flame arrestor.

The total gas flow rate to the flare used was 490 Mscfd, and this is based on a condensate flash factor and gas composition provided by Marathon Oil. The gas composition used was the average composition from the February 2017 Clarks Creek (MM) Analysis Summary. Credit was taken for the VRT for the Irish CTB gas flow rate thereby reducing the amount of flashed gas that was calculated using the provided flash gas factor.

Using the same calculation methodology, the total allowable gas flow rates were calculated such that the tank pressures remain below the opening pressure of an Enardo ES-660 thief hatch (14.4 oz/in^2). The maximum allowable flow rates are reported below and assume the other facility flow rate remains constant as predicted.

Facility Scenario	Flow Rate [Mscfd]	% of Predicted Peak
Irish Maximum Allowable	390	330%
Gretchen Maximum Allowable	455	120%

For the listed maximum allowable rate, the flow rate from the other system was held constant at predicted peak rate.

Standard pressure drop "K" value for fittings and valves per Crane Technical Paper 410 were used. The value used for the absolute roughness of steel was 0.00015 ft.

**Attached are the tabulated results of the hydraulic calculations*

Disclaimer:

This assessment meets the certification requirements of 40 CFR part 60 subpart 0000a. It is the responsibility of *Marathon Oil* to comply with the reporting requirements of this regulation.

This evaluation does not consider the destructive efficiency of the control device or components upstream of the tank vent design.

JOANNE QUALE CTB VENT LINE DESIGN AND CAPACITY ASSESSMENT

(b) (6) [redacted]

TO:	Marathon Oil
FROM:	Nigel Wang, Dylan Fortin
CC:	Jeff Wellen
DATE:	August 3, 2018
RE:	Joanne Quale CTB - Vent Line Design and Capacity Assessment Rev. 0

The US EPA finalized "Standards of Performance for Crude Oil and Natural Gas Facilities for which Construction, Modification or Reconstruction Commenced After September 18, 2015" on June 3, 2016. This regulation has requirements for certifying the design of closed vent systems. An assessment of the closed vent must be performed to determine it is of sufficient design and capacity to ensure that all emissions from storage vessels are routed to the control device or process and have it certified by a qualified professional engineer. This regulation is 40 CFR 60 Subpart OOOOa, referred to as the OOOOa regulation.

Certification for 40 CFR 60.5411a(d):

"I certify that the closed vent system design and capacity assessment was prepared under my direction or supervision. I further certify that the closed vent system design and capacity assessment was conducted and this report was prepared pursuant to the requirements of subpart OOOOa of 40 CFR part 60. Based on my professional knowledge and experience, and inquiry of personnel involved in the assessment, the certification submitted herein is true, accurate, and complete. I am aware that there are penalties for knowingly submitting false information."

Purpose:

Evaluate the new Joanne Quale CTB vent line design to ensure that the Enardo ES-660 thief hatches, which are set at 16 oz/in^2, will not open during normal operating flow rate scenarios. The normal flow path for the vapor from the storage tanks will be to one flare where the off gas will be combusted to meet OOOOa regulations.

Results:

Based on the vent system 3D model (dated July 27, 2018) and predicted vapor flow rates, Halker Consulting evaluated the pipe routing from the storage tanks to the flare and calculated the expected pressure drop in the system during the Marathon Oil specified predicted vapor flow rates. The pressure at the outlet of the flare was set at local atmospheric pressure of 13.7 psia. Pressure drop through the piping system from the furthest storage tank to the flare was calculated and found to have a backpressure on the tank battery of 6.2 oz/in^{2}g.

During normal operating conditions the 6.2 oz/in^{2}g pressure should be the highest pressure that the tanks will see and is 39% of the of 16 oz/in^{2}g set pressure of the thief hatch.

Calculations:

A flare tip pressure drop of 0.0 oz/in^2 was used and was based on information provided by Steffes Flare systems for the Air Assist Model 4. The flame arrestor pressure drop used was 0.874 oz/in^2 and is based on the Enardo sizing program for a 4" Series 8 inline flame arrestor.

The total gas flow rate to the flare used was 240 Mscfd, and is based on a condensate flash factor and gas composition provided by Marathon Oil. The gas composition used was the average composition from the February 2017 Clarks Creek (MM) Analysis Summary. Credit was taken for the VRT thereby reducing the amount of flashed gas that was calculated using the provided flash gas factor.

Using the same calculation methodology, the total gas flow rate can be increased to approximately 380 Mscfd and stay at or below the opening pressure of an Enardo ES-660 thief hatch (14.4 oz/in^2). This is approximately 1.58 times the normal operating flow.

Standard pressure drop "K" value for fittings and valves per Crane Technical Paper 410 were used. The value used for the absolute roughness of steel was 0.00015 ft.

**Attached are the tabulated results of the hydraulic calculations*

Disclaimer:

This assessment meets the certification requirements of 40 CFR part 60 subpart 0000a. It is the responsibility of *Marathon Oil* to comply with the reporting requirements of this regulation.

This evaluation does not consider the destructive efficiency of the control device or components upstream of the tank vent design.

JULIA JONES VENT LINE DESIGN AND CAPACITY ASSESSMENT

TO:	Marathon Oil	(b) (6) [redacted]
FROM:	Dylan Fortin	
CC:	Jeff Wellen	
DATE:	June 28, 2018	
RE:	Julia Jones CTB - Vent Line Design and Capacity Assessment – Rev 0	

The US EPA finalized "Standards of Performance for Crude Oil and Natural Gas Facilities for which Construction, Modification or Reconstruction Commenced After September 18, 2015" on June 3, 2016. This regulation has requirements for certifying the design of closed vent systems. An assessment of the closed vent must be performed to determine it is of sufficient design and capacity to ensure that all emissions from storage vessels are routed to the control device or process and have it certified by a qualified professional engineer. This regulation is 40 CFR 60 Subpart OOOOa, referred to as the OOOOa regulation.

Certification for 40 CFR 60.5411a(d):

"I certify that the closed vent system design and capacity assessment was prepared under my direction or supervision. I further certify that the closed vent system design and capacity assessment was conducted and this report was prepared pursuant to the requirements of subpart OOOOa of 40 CFR part 60. Based on my professional knowledge and experience, and inquiry of personnel involved in the assessment, the certification submitted herein is true, accurate, and complete. I am aware that there are penalties for knowingly submitting false information."

Purpose:

Evaluate the new Julia Jones CTB vent line design to ensure that the Enardo ES-660 thief hatches, which are set at 16 oz/in^2, will not open during normal operating flow rate scenarios. The normal flow path for the vapor from the storage tanks will be to one flare where the off gas will be combusted to meet OOOOa regulations.

Results:

Based on the vent system 3D model (dated June 27, 2018) and predicted vapor flow rates, Halker Consulting evaluated the pipe routing from the storage tanks to the flare and calculated the expected pressure drop in the system during the Marathon Oil specified maximum predicted vapor flow rates. The pressure at the outlet of the flare was set at local atmospheric pressure of 13.5 psia. Pressure drop through the piping system from the furthest storage tank to the flare was calculated and found to have a backpressure on the tank battery of 6.4 oz/in^2g. This should be the highest pressure that the tanks will see and is 34.6% of the of 16 oz/in^2g set pressure of the thief hatch.

Calculations:

A flare tip pressure drop of 0.0 oz/in^2 was used and was based on information provided by Steffes Flare systems for the Air Assist Model 4. The flame arrestor pressure drop used was 0.7 oz/in^2 and is based on the Enardo sizing program for a 6" Series 8 inline flame arrestor.

The total gas flow rate to the flare used was 572 Mscfd, and is based on a condensate flash factor and gas composition provided by Marathon Oil. The gas composition used was the average composition from the February 2017 Clarks Creek (MM) Analysis Summary. It was assumed that there are 5 new wells on site generating 11,000 bopd equally. Credit was taken for 3 of these wells flowing through the VRT thereby reducing the amount of flashed gas that was calculated using the provided flash gas factor. The other 2 wells were assumed to produce down test production lines, bypassing the VRT. For these 2 wells no credit was taken for the VRT.

Using the same calculation methodology, the total gas flow rate can be increased to approximately 880 Mscfd and stay at or below the opening pressure of an Enardo ES-660 thief hatch (14.4 oz/in^2). This is approximately 1.66 times the normal operating flow.

Standard pressure drop "K" value for fittings and valves per Crane Technical Paper 410 were used. The value used for the absolute roughness of steel was 0.00015 ft.

**Attached are the tabulated results of the hydraulic calculations*

Disclaimer:

This assessment meets the certification requirements of 40 CFR part 60 subpart OOOOa. It is the responsibility of *Marathon Oil* to comply with the reporting requirements of this regulation.

This evaluation does not consider the destructive efficiency of the control device or components upstream of the tank vent design.

KENT CARLSON 14 CTB VENT LINE DESIGN AND CAPACITY ASSESSMENT

TO:	Marathon Oil
FROM:	Nigel Wang, Dylan Fortin
CC:	Jeff Wellen
DATE:	March 14, 2019
RE:	Kent Carlson 14 - Vent Line Design and Capacity Assessment Rev 0

(b) (6) [redacted]

The US EPA finalized "Standards of Performance for Crude Oil and Natural Gas Facilities for which Construction, Modification or Reconstruction Commenced After September 18, 2015" on June 3, 2016. This regulation has requirements for certifying the design of closed vent systems. An assessment of the closed vent must be performed to determine it is of sufficient design and capacity to ensure that all emissions from storage vessels are routed to the control device or process and have it certified by a qualified professional engineer. This regulation is 40 CFR 60 Subpart OOOOa, referred to as the OOOOa regulation.

Certification for 40 CFR 60.5411a(d):

"I certify that the closed vent system design and capacity assessment was prepared under my direction or supervision. I further certify that the closed vent system design and capacity assessment was conducted and this report was prepared pursuant to the requirements of subpart OOOOa of 40 CFR part 60. Based on my professional knowledge and experience, and inquiry of personnel involved in the assessment, the certification submitted herein is true, accurate, and complete. I am aware that there are penalties for knowingly submitting false information."

Purpose:

Evaluate the new Kent Carlson 14 CTB vent line design to ensure that the Enardo ES-660 thief hatches, which are set at 16 oz/in^2, will not open during normal operating flow rate scenarios. The normal flow path for the vapor from the storage tanks will be to two flares where the off gas will be combusted to meet OOOOa regulations.

Results:

Based on the vent system in the Kent Carlson 14 Rev 0 3D model (transmitted March 12, 2019) and predicted vapor flow rates, Halker Consulting evaluated the pipe routing from the storage tanks to the flares and calculated the expected pressure drop in the system during the Marathon Oil specified maximum predicted vapor flow rate of 750 Mscfd during flowback. The pressure at the outlet of the flare was set at local atmospheric pressure of 13.7 psia. Pressure drop through the piping system from the furthest storage tank to the flare was calculated and found to have a backpressure on the tank battery of 7.1 oz/in^{2}g.

During normal operating conditions, 7.1 oz/in^{2}g pressure should be the highest pressure that the tanks will see and therefore the Enardo thief hatches will not open.

Calculations:

A flare tip pressure drop of 0.0 oz/in^2 was used and was based on information provided by Steffes Flare systems for the Air Assist Model 4. The flame arrestor pressure drop used was 1.98 oz/in^2 and is based on the Enardo sizing program for a 4" Series 8 inline flame arrestor.

The total gas flow rate to the flares used was 750 Mscfd and is based on a condensate flash factor and gas composition provided by Marathon Oil. The gas composition used was the average composition from the February 2017 Clarks Creek (MM) Analysis Summary.

Using the same calculation methodology, the total gas flow rate can be increased to approximately 1102 Mscfd and stay at or below the opening pressure of an Enardo ES-660 thief hatch (14.4 oz/in^2). This is approximately 1.47 times the normal operating flow. The crack pressure of the Enardo ES-660s was assumed to be 90% of the set pressure based on review of the device product data sheet.

Standard pressure drop "K" value for fittings and valves per Crane Technical Paper 410 were used. The value used for the absolute roughness of steel was 0.00015 ft.

**Attached are the tabulated results of the hydraulic calculations*

Disclaimer:

This assessment meets the certification requirements of 40 CFR part 60 subpart 0000a. It is the responsibility of *Marathon Oil* to comply with the reporting requirements of this regulation.

This evaluation does not consider the destructive efficiency of the control device or components upstream of the tank vent design.

STATE KREIGER CTB VENT LINE DESIGN AND CAPACITY ASSESSMENT

TO:	Marathon Oil
FROM:	KC Agwu, Dylan Fortin
CC:	Jeff Wellen
DATE:	December 4, 2018
RE:	State Kreiger CTB - Vent Line Design and Capacity Assessment, Rev 0

(b) (6) [redacted]

The US EPA finalized "Standards of Performance for Crude Oil and Natural Gas Facilities for which Construction, Modification or Reconstruction Commenced After September 18, 2015" on June 3, 2016. This regulation has requirements for certifying the design of closed vent systems. An assessment of the closed vent must be performed to determine it is of sufficient design and capacity to ensure that all emissions from storage vessels are routed to the control device or process and have it certified by a qualified professional engineer. This regulation is 40 CFR 60 Subpart OOOOa, referred to as the OOOOa regulation.

Certification for 40 CFR 60.5411a(d):

"I certify that the closed vent system design and capacity assessment was prepared under my direction or supervision. I further certify that the closed vent system design and capacity assessment was conducted and this report was prepared pursuant to the requirements of subpart OOOOa of 40 CFR part 60. Based on my professional knowledge and experience, and inquiry of personnel involved in the assessment, the certification submitted herein is true, accurate, and complete. I am aware that there are penalties for knowingly submitting false information."

Purpose:

Evaluate the new State Kreiger CTB vent line design to ensure that the Enardo ES-660 thief hatches, which are set at 16 oz/in^2, will not open during normal operating flow rate scenarios. The normal flow path for the vapor from the storage tanks will be to one flare where the off gas will be combusted to meet OOOOa regulations.

Results:

Based on the vent system in the State Kreiger CTB Rev 0 3D model, (transmitted on November 19, 2018), and the predicted vapor flow rates, Halker Consulting evaluated the pipe routing from the storage tanks to the flare and calculated the expected pressure drop in the system during the Marathon Oil specified maximum predicted vapor flow rates. The pressure at the outlet of the flare was set at local atmospheric pressure of 13.7 psia. Pressure drop through the piping system from the furthest storage tank to the flare was calculated and found to have a backpressure on the tank battery of 8.1 oz/in^{2}g.

During normal operating conditions 8.1 oz/in^{2}g pressure is the highest pressure that the tanks will see and the Enardo thief hatches will not open.

Calculations:

A flare tip pressure drop of 0.0 oz/in² was used and was based on information provided by Steffes Flare systems for the Air Assist Model 4. The flame arrestor pressure drop used was 0.835 oz/in² and is based on the Enardo sizing program for a 6" Series 8 inline flame arrestor.

The total gas flow rate to the flare used was 600 Mscfd and is based on a condensate flash factor and gas composition provided by Marathon Oil. The gas composition used was the average composition from the February 2017 Clarks Creek (MM) Analysis Summary.

Using the same calculation methodology, the total gas flow rate can be increased to approximately 815 Mscfd and stay at or below the opening pressure of an Enardo ES-660 thief hatch (14.4 oz/in²). This is approximately 1.36 times the normal operating flow. The crack pressure of the Enardo ES-660's were assumed to be 90% of the set pressure based on review of the device product data sheet.

Standard pressure drop "K" value for fittings and valves per Crane Technical Paper 410 were used. The value used for the absolute roughness of steel was 0.00015 ft.

**Attached are the tabulated results of the hydraulic calculations*

Disclaimer:

This assessment meets the certification requirements of 40 CFR part 60 subpart 0000a. It is the responsibility of *Marathon Oil* to comply with the reporting requirements of this regulation.

This evaluation does not consider the destructive efficiency of the control device or components upstream of the tank vent design.

LARS CTB VENT LINE DESIGN AND CAPACITY ASSESSMENT

TO:	Marathon Oil
FROM:	Dylan Fortin
CC:	Kendra Meeker, Jeff Wellen
DATE:	March 16, 2018
RE:	Lars CTB - Vent Line Design and Capacity Assessment

(b) (6) [redacted]

The US EPA finalized "Standards of Performance for Crude Oil and Natural Gas Facilities for which Construction, Modification or Reconstruction Commenced After September 18, 2015" on June 3, 2016. This regulation has requirements for certifying the design of closed vent systems. An assessment of the closed vent must be performed to determine it is of sufficient design and capacity to ensure that all emissions from storage vessels are routed to the control device or process and have it certified by a qualified professional engineer. This regulation is 40 CFR 60 Subpart OOOOa, referred to as the Quad Oa regulation.

Certification for 40 CFR 60.5411a(d):

"I certify that the closed vent system design and capacity assessment was prepared under my direction or supervision. I further certify that the closed vent system design and capacity assessment was conducted and this report was prepared pursuant to the requirements of subpart OOOOa of 40 CFR part 60. Based on my professional knowledge and experience, and inquiry of personnel involved in the assessment, the certification submitted herein is true, accurate, and complete. I am aware that there are penalties for knowingly submitting false information."

Purpose:

Evaluate the new Lars CTB vent line design to ensure that the Enardo ES-660 thief hatches, which are set at 16 oz/in^2, will not open during normal operating flow rate scenarios. The normal flow path for the vapor from the storage tanks will be to one flare where the off gas will be combusted to meet Quad Oa regulations.

Results:

Based on the vent system 3D model (dated 3/13/2018) and predicted vapor flow rates, Halker Consulting evaluated the pipe routing from the storage tanks to the flare and calculated the expected pressure drop in the system during the Marathon Oil specified maximum predicted vapor flow rates. The pressure at the outlet of the flare was set at local atmospheric pressure of 13.5 psia. Pressure drop through the piping system from the furthest storage tank to the flare was calculated and found to have a backpressure on the tank battery of 0.22 psig (3.5 oz/in^{2}g).

During normal operating conditions the 3.5 oz/in^{2}g pressure should be the highest pressure that the tanks will see and is 22% of the of 16 oz/in^{2}g set pressure of the thief hatch.

Calculations:

A flare tip pressure drop of 0.0 oz/in^2 was used and was based on information provided by Steffes Flare systems for the Air Assist Model 4. The flame arrestor pressure drop used was 0.6 oz/in^2 and is based on the Enardo sizing program for a 6" Series 8 inline flame arrestor.

The peak gas flow rate to the flare used was 500 Mscfd, and is based on a condensate flash factor and gas composition provided by Marathon Oil. The gas composition used was the average composition from the February 2017 Clarks Creek (MM) Analysis Summary.

Using the same calculation methodology, the total gas flow rate can be increased to approximately 1,055 Mscfd and stay at or below the opening pressure of an Enardo ES-660 thief hatch (14.4 oz/in^2). This is approximately 2 times the normal operating flow.

Standard pressure drop "K" values for fittings and valves per Crane Technical Paper 410 were used. The value used for the absolute roughness of steel was 0.00015 ft.

**Attached are the tabulated results of the hydraulic calculations*

Disclaimer:

This assessment meets the certification requirements of 40 CFR part 60 subpart 0000a. It is the responsibility of *Marathon Oil* to comply with the reporting requirements of this regulation.

This evaluation does not consider the destructive efficiency of the controlled device or components upstream of the tank vent design.

LUTHER-WEIDMAN CTB VENT LINE DESIGN AND CAPACITY ASSESSMENT

TO:	Marathon Oil	(b) (6) [redacted]
FROM:	Dylan Fortin, Will Myers	
CC:	Jeff Wellen	
DATE:	February 7, 2019	
RE:	Luther-Weidman CTB - Vent Line Design and Capacity Assessment Rev 0	

The US EPA finalized "Standards of Performance for Crude Oil and Natural Gas Facilities for which Construction, Modification or Reconstruction Commenced After September 18, 2015" on June 3, 2016. This regulation has requirements for certifying the design of closed vent systems. An assessment of the closed vent must be performed to determine it is of sufficient design and capacity to ensure that all emissions from storage vessels are routed to the control device or process and have it certified by a qualified professional engineer. This regulation is 40 CFR 60 Subpart OOOOa, referred to as the OOOOa regulation.

Certification for 40 CFR 60.5411a(d):

"I certify that the closed vent system design and capacity assessment was prepared under my direction or supervision. I further certify that the closed vent system design and capacity assessment was conducted and this report was prepared pursuant to the requirements of subpart OOOOa of 40 CFR part 60. Based on my professional knowledge and experience, and inquiry of personnel involved in the assessment, the certification submitted herein is true, accurate, and complete. I am aware that there are penalties for knowingly submitting false information."

Purpose:

Evaluate the new Luther-Weidman CTB vent line design to ensure that the Enardo ES-660 thief hatches, which are set at 16 oz/in^2, will not open during normal operating flow rate scenarios. Luther-Weidman CTB consists of a bulk and test facility (Luther-Weidman) and a section line facility (Weidman). Each facility has its own tank battery, tank vent line, and flare scrubbers. Both facility vent lines commingle downstream of the flare scrubbers prior to being combusted by one low pressure flare to meet OOOOa regulations.

Results:

Based on the vent system in the Luther-Weidman CTB Rev 0 3D model (transmitted on February 5, 2019) and predicted vapor flow rates, Halker Consulting evaluated the pipe routing from the storage tanks to the flare and calculated the expected pressure drop in the system during the Marathon Oil specified maximum predicted vapor flow rates. The pressure at the outlet of the flare was set at local atmospheric pressure of 13.7 psia. Since Luther-Weidman consists of two separate tank batteries which are commingled, two different tank battery pressures were calculated. For normal predicted peak flow rate scenarios (Attachment 1), the calculated pressures at the farthest tank for the Luther-Weidman and Weidman tank batteries are 7.6 and 10.0 oz/in^{2}g, respectively.

During normal operating conditions the Enardo thief hatches will not open.

Calculations:

A flare tip pressure drop of 0.0 oz/in² was used and was based on information provided by Steffes Flare systems for the Air Assist Model 4. The flame arrestor pressure drop used was 0.803 oz/in² and is based on the Enardo sizing program for a 6" Series 8 inline flame arrestor.

The total gas flow rate to the flare used was 560 Mscfd, and this is based on a condensate flash factor and gas composition provided by Marathon Oil. The gas composition used was the average composition from the February 2017 Clarks Creek (MM) Analysis Summary. Credit was taken for the VRT for the Luther-Weidman CTB gas flow rate thereby reducing the amount of flashed gas that was calculated using the provided flash gas factor.

Using the same calculation methodology, the total allowable gas flow rates were calculated such that the tank pressures remain below the opening pressure of an Enardo ES-660 thief hatch (14.4 oz/in²). The crack pressure of the Enardo ES-660's was assumed to be 90% of the set pressure based on review of the device product data sheet. The maximum allowable flow rates are reported below and assume the other facility flow rate remains constant as predicted.

Facility Scenario	Individual System Flow Rate [Mscfd]	Total System Flowrate [Mscfd]	% of Individual System Predicted Peak
Luther-Weidman Maximum Allowable	364	684	152%
Weidman Maximum Allowable	399	639	125%

Standard pressure drop "K" value for fittings and valves per Crane Technical Paper 410 were used. The value used for the absolute roughness of steel was 0.00015 ft.

**Attached are the tabulated results of the hydraulic calculations*

Disclaimer:

This assessment meets the certification requirements of 40 CFR part 60 subpart 0000a. It is the responsibility of *Marathon Oil* to comply with the reporting requirements of this regulation.

This evaluation does not consider the destructive efficiency of the control device or components upstream of the tank vent design.

MASON CTB VENT LINE DESIGN AND CAPACITY ASSESSMENT

TO:	Marathon Oil	(b) (6) [redacted]
FROM:	KC Agwu, Dylan Fortin	
CC:	Jeff Wellen	
DATE:	February 19, 2019	
RE:	Mason CTB - Vent Line Design and Capacity Assessment Rev 0	

The US EPA finalized "Standards of Performance for Crude Oil and Natural Gas Facilities for which Construction, Modification or Reconstruction Commenced After September 18, 2015" on June 3, 2016. This regulation has requirements for certifying the design of closed vent systems. An assessment of the closed vent must be performed to determine it is of sufficient design and capacity to ensure that all emissions from storage vessels are routed to the control device or process and have it certified by a qualified professional engineer. This regulation is 40 CFR 60 Subpart OOOOa, referred to as the OOOOa regulation.

Certification for 40 CFR 60.5411a(d):

"I certify that the closed vent system design and capacity assessment was prepared under my direction or supervision. I further certify that the closed vent system design and capacity assessment was conducted and this report was prepared pursuant to the requirements of subpart OOOOa of 40 CFR part 60. Based on my professional knowledge and experience, and inquiry of personnel involved in the assessment, the certification submitted herein is true, accurate, and complete. I am aware that there are penalties for knowingly submitting false information."

Purpose:

Evaluate the new Mason CTB vent line design to ensure that the Enardo ES-660 thief hatches, which are set at 16 oz/in^2, will not open during normal operating flow rate scenarios. The normal flow path for the vapor from the storage tanks will be to two flares where the off gas will be combusted to meet OOOOa regulations.

Results:

Based on the vent system in the Mason CTB Rev 0 3D model (transmitted February 18, 2019) and predicted vapor flow rates, Halker Consulting evaluated the pipe routing from the storage tanks to the flare and calculated the expected pressure drop in the system during the Marathon Oil specified maximum predicted vapor flow rates. The pressure at the outlet of the flare was set at local atmospheric pressure of 13.7 psia. Pressure drop through the piping system from the furthest storage tank to the flare was calculated and found to have a backpressure on the tank battery of 7.4 oz/in^{2}g.

During normal operating conditions the 7.4 oz/in^{2}g pressure should be the highest pressure that the tanks will see and the Enardo thief hatches will not open.

Calculations:

A flare tip pressure drop of 0.0 oz/in^2 was used and was based on information provided by Steffes Flare systems for the Air Assist Model 4. The flame arrestor pressure drop used was 2.21 oz/in^2 and is based on the Enardo sizing program for a 4" Series 8 inline eccentric flame arrestor.

The total gas flow rate to the flare used was 800 Mscfd and is based on a condensate flash factor and gas composition provided by Marathon Oil. The gas composition used was the average composition from the February 2017 Clarks Creek (MM) Analysis Summary.

Using the same calculation methodology, the total gas flow rate can be increased to approximately 1145 Mscfd and stay at or below the opening pressure of an Enardo ES-660 thief hatch (14.4 oz/in^2). This is approximately 1.43 times the normal operating flow. The crack pressure of the Enardo ES-660s was assumed to be 90% of the set pressure based on review of the device product data sheet.

Standard pressure drop "K" value for fittings and valves per Crane Technical Paper 410 were used. The value used for the absolute roughness of steel was 0.00015 ft.

**Attached are the tabulated results of the hydraulic calculations*

Disclaimer:

This assessment meets the certification requirements of 40 CFR part 60 subpart 0000a. It is the responsibility of *Marathon Oil* to comply with the reporting requirements of this regulation.

This evaluation does not consider the destructive efficiency of the control device or components upstream of the tank vent design.

NESS CTB VENT LINE DESIGN AND CAPACITY ASSESSMENT

TO:	Marathon Oil
FROM:	Dylan Fortin
CC:	Jeff Wellen
DATE:	July 6, 2018
RE:	Ness CTB - Vent Line Design and Capacity Assessment Rev 0 - IFI

(b) (6) [redacted]

The US EPA finalized "Standards of Performance for Crude Oil and Natural Gas Facilities for which Construction, Modification or Reconstruction Commenced After September 18, 2015" on June 3, 2016. This regulation has requirements for certifying the design of closed vent systems. An assessment of the closed vent must be performed to determine it is of sufficient design and capacity to ensure that all emissions from storage vessels are routed to the control device or process and have it certified by a qualified professional engineer. This regulation is 40 CFR 60 Subpart OOOOa, referred to as the Quad Oa regulation.

Certification for 40 CFR 60.5411a(d):

"I certify that the closed vent system design and capacity assessment was prepared under my direction or supervision. I further certify that the closed vent system design and capacity assessment was conducted and this report was prepared pursuant to the requirements of subpart OOOOa of 40 CFR part 60. Based on my professional knowledge and experience, and inquiry of personnel involved in the assessment, the certification submitted herein is true, accurate, and complete. I am aware that there are penalties for knowingly submitting false information."

Purpose:

Evaluate the new Ness CTB vent line design to ensure that the Enardo ES-660 thief hatches, which are set at 16 oz/in^2, will not open during normal operating flow rate scenarios. The normal flow path for the vapor from the storage tanks will be to one flare where the off gas will be combusted to meet Quad Oa regulations.

Results:

Based on the vent system 3D model (dated 7/2/2018) and predicted vapor flow rates, Halker Consulting evaluated the pipe routing from the storage tanks to the flare and calculated the expected pressure drop in the system during the Marathon Oil specified predicted vapor flow rates. The pressure at the outlet of the flare was set at local atmospheric pressure of 13.5 psia. Pressure drop through the piping system from the furthest storage tank to the flare was calculated and found to have a backpressure on the tank battery of 2.1 oz/in^{2}g.

During normal operating conditions the 2.1 oz/in^{2}g pressure should be the highest pressure that the tanks will see and is 13 % of the of 16 oz/in^{2}g set pressure of the thief hatch.

Calculations:

A flare tip pressure drop of 0.0 oz/in^2 was used and was based on information provided by Steffes Flare systems for the Air Assist Model 4. The flame arrestor pressure drop used was 0.37 oz/in^2 and is based on the Enardo SOFTCALC II sizing program for a 4" Series 8 inline flame arrestor.

The total gas flow rate to the flare used was 140 Mscfd and is based on a condensate flash factor and gas composition provided by Marathon Oil. The gas composition used was the average composition from the February 2017 Clarks Creek (MM) Analysis Summary. Credit was taken for the VRT thereby reducing the amount of flashed gas that was calculated using the provided flash gas factor.

Using the same calculation methodology, the total gas flow rate can be increased to approximately 396 Mscfd and stay at or below the opening pressure of an Enardo ES-660 thief hatch (14.4 oz/in^2). This is approximately 283 % the normal operating flow.

Standard pressure drop "K" value for fittings and valves per Crane Technical Paper 410 were used. The value used for the absolute roughness of steel was 0.00015 ft.

**Attached are the tabulated results of the hydraulic calculations*

Disclaimer:

This assessment meets the certification requirements of 40 CFR 60 subpart 0000a. It is the responsibility of *Marathon Oil* to comply with the reporting requirements of this regulation.

This evaluation does not consider the destructive efficiency of the control device or components upstream of the tank vent design.

RANGER CTB VENT LINE DESIGN AND CAPACITY ASSESSMENT

(b) (6) [redacted]

TO: Marathon Oil

FROM: Dylan Fortin – Halker Consulting

CC: Jeff Wellen

DATE: May 17, 2018

RE: Marathon Oil Ranger CTB TVCS- Vent Line Design and Capacity Assessme[redacted]

The US EPA finalized "Standards of Performance for Crude Oil and Natural Gas Facilities for which Construction, Modification or Reconstruction Commenced After September 18, 2015" on June 3, 2016. This regulation has requirements for certifying the design of closed vent systems. An assessment of the closed vent must be performed to determine it is of sufficient design and capacity to ensure that all emissions from storage vessels are routed to the control device or process and have it certified by a qualified professional engineer. This regulation is 40 CFR 60 Subpart OOOOa, referred to as the Quad Oa regulation.

Certification for 40 CFR 60.5411a(d):

"I certify that the closed vent system design and capacity assessment was prepared under my direction or supervision. I further certify that the closed vent system design and capacity assessment was conducted and this report was prepared pursuant to the requirements of subpart OOOOa of 40 CFR part 60. Based on my professional knowledge and experience, and inquiry of personnel involved in the assessment, the certification submitted herein is true, accurate, and complete. I am aware that there are penalties for knowingly submitting false information."

Purpose:

Evaluate the new Ranger CTB vent line design to ensure that the Enardo ES-660 thief hatches, which are set at 16 oz/in^2, will not open during normal operating flow rate scenarios. The normal flow path for the vapor from the storage tanks will be to one flare where the off gas will be combusted to meet OOOOa regulations.

Results:

Based on the vent system 3D model (dated January 26, 2018) provided by Marathon and predicted vapor flow rates, Halker Consulting evaluated the pipe routing from the storage tanks to the flare and calculated the expected pressure drop in the system during the Marathon Oil specified maximum predicted vapor flow rates. The pressure at the outlet of the flare was set at local atmospheric pressure of 13.5 psia. Pressure drop through the piping system from the furthest storage tank to the flare was calculated and found to have a backpressure on the tank battery of 1.2 oz/in^{2}g.

During normal operating conditions the 1.2 oz/in^{2}g pressure should be the highest pressure that the tanks will see and is7% of the of 16 oz/in^{2}g set pressure of the thief hatch.

Calculations:

A flare tip pressure drop of 0 oz/in² was used and was based on information provided by Steffes Flare systems for the Air Assist Model 4. The flame arrestor pressure drop used was 0.207 oz/in² and is based on the Enardo sizing program for a 6" Series 8 inline flame arrestor.

The total gas flow rate to the flare used was 220 Mscfd, and is based on a condensate flash factor and gas composition provided by Marathon Oil. The gas composition used was the average composition from the February 2017 Clarks Creek (MM) Analysis Summary. Credit was taken for the VRT thereby reducing the amount of flashed gas that was calculated using the provided flash gas factor.

Using the same calculation methodology, the total gas flow rate can be increased to approximately 840 Mscfd and stay at or below the opening pressure of an Enardo ES-660 thief hatch (14.4 oz/in²). This is approximately 3.8 times the normal operating flow.

Standard pressure drop "K" value for fittings and valves per Crane Technical Paper 410 were used. The value used for the absolute roughness of steel was 0.0005 ft.

**Attached are the tabulated results of the hydraulic calculations*

Disclaimer:

This assessment meets the certification requirements of 40 CFR part 60 subpart 0000a. It is the responsibility of *Marothon Oil* to comply with the reporting requirements of this regulation.

This evaluation does not consider the destructive efficiency of the control device or components upstream of the tank vent design.

ROSA BENZ CTB VENT LINE DESIGN AND CAPACITY ASSESSMENT

TO:	Marathon Oil	[redacted]
FROM:	KC Agwu, Dylan Fortin	
CC:	Brianne Stebbins	
DATE:	March 20, 2019	
RE:	Rosa Benz CTB - Vent Line Design and Capacity Assessment Rev 0	

The US EPA finalized "Standards of Performance for Crude Oil and Natural Gas Facilities for which Construction, Modification or Reconstruction Commenced After September 18, 2015" on June 3, 2016. This regulation has requirements for certifying the design of closed vent systems. An assessment of the closed vent must be performed to determine it is of sufficient design and capacity to ensure that all emissions from storage vessels are routed to the control device or process and have it certified by a qualified professional engineer. This regulation is 40 CFR 60 Subpart OOOOa, referred to as the OOOOa regulation.

Certification for 40 CFR 60.5411a(d):

"I certify that the closed vent system design and capacity assessment was prepared under my direction or supervision. I further certify that the closed vent system design and capacity assessment was conducted and this report was prepared pursuant to the requirements of subpart OOOOa of 40 CFR part 60. Based on my professional knowledge and experience, and inquiry of personnel involved in the assessment, the certification submitted herein is true, accurate, and complete. I am aware that there are penalties for knowingly submitting false information."

Purpose:

Evaluate the new Rosa Benz CTB vent line design to ensure that the Enardo ES-660 thief hatches, which are set at 16 oz/in^2, will not open during normal operating flow rate scenarios. The normal flow path for the vapor from the storage tanks will be to one flare where the off gas will be combusted to meet OOOOa regulations.

Results:

Based on the vent system in the Rosa Benz CTB Rev 0 3D model and predicted vapor flow rates, Halker Consulting evaluated the pipe routing from the storage tanks to the flare and calculated the expected pressure drop in the system during the Marathon Oil specified maximum predicted vapor flow rates. The pressure at the outlet of the flare was set at local atmospheric pressure of 13.7 psia. Pressure drop through the piping system from the furthest storage tank to the flare was calculated and found to have a backpressure on the tank battery of 2.7 oz/in^{2}g.

During normal operating conditions the 2.7 oz/in^{2}g pressure should be the highest pressure that the tanks will see and the Enardo thief hatches will not open.

Calculations:

A flare tip pressure drop of 0.0 oz/in^2 was used and was based on information provided by Steffes Flare systems for the Air Assist Model 4. The flame arrestor pressure drop used was 0.944 oz/in^2 and is based on the Enardo sizing program for a 4" Series 8 inline flame arrestor.

The total gas flow rate to the flare used was 240 Mscfd and is based on a condensate flash factor and gas composition provided by Marathon Oil. The gas composition used was the average composition from the February 2017 Clarks Creek (MM) Analysis Summary. Credit was taken for the VRT thereby reducing the amount of flashed gas that was calculated using the provided flash gas factor.

Using the same calculation methodology, the total gas flow rate can be increased to approximately 605 Mscfd and stay at or below the opening pressure of an Enardo ES-660 thief hatch (14.4 oz/in^2). This is approximately 2.52 times the normal operating flow. The crack pressure of the Enardo ES-660s was assumed to be 90% of the set pressure based on review of the device product data sheet.

Standard pressure drop "K" value for fittings and valves per Crane Technical Paper 410 were used. The value used for the absolute roughness of steel was 0.00015 ft.

**Attached are the tabulated results of the hydraulic calculations*

Disclaimer:

This assessment meets the certification requirements of 40 CFR part 60 subpart 0000a. It is the responsibility of *Marathon Oil* to comply with the reporting requirements of this regulation.

This evaluation does not consider the destructive efficiency of the control device or components upstream of the tank vent design.

RED FEATHER CTB VENT LINE DESIGN AND CAPACITY ASSESSMENT

TO:	Marathon Oil
FROM:	Dylan Fortin, Will Myers
CC:	Jeff Wellen
DATE:	January 11, 2019
RE:	Red feather CTB - Vent Line Design and Capacity Assessment Rev 0

(b) (6) [redacted]

The US EPA finalized "Standards of Performance for Crude Oil and Natural Gas Facilities for which Construction, Modification or Reconstruction Commenced After September 18, 2015" on June 3, 2016. This regulation has requirements for certifying the design of closed vent systems. An assessment of the closed vent must be performed to determine it is of sufficient design and capacity to ensure that all emissions from storage vessels are routed to the control device or process and have it certified by a qualified professional engineer. This regulation is 40 CFR 60 Subpart OOOOa, referred to as the OOOOa regulation.

Certification for 40 CFR 60.5411a(d):

"I certify that the closed vent system design and capacity assessment was prepared under my direction or supervision. I further certify that the closed vent system design and capacity assessment was conducted and this report was prepared pursuant to the requirements of subpart OOOOa of 40 CFR part 60. Based on my professional knowledge and experience, and inquiry of personnel involved in the assessment, the certification submitted herein is true, accurate, and complete. I am aware that there are penalties for knowingly submitting false information."

Purpose:

Evaluate the new Red feather CTB vent line design to ensure that the Enardo ES-660 thief hatches, which are set at 16 oz/in^2, will not open during normal operating flow rate scenarios. The normal flow path for the vapor from the storage tanks will be to one flare where the off gas will be combusted to meet OOOOa regulations.

Results:

Based on the vent system in the Red feather CTB Rev 0 3D model (transmitted January 11, 2019) and predicted vapor flow rates, Halker Consulting evaluated the pipe routing from the storage tanks to the flare and calculated the expected pressure drop in the system during the Marathon Oil specified maximum predicted vapor flow rates. The pressure at the outlet of the flare was set at local atmospheric pressure of 13.7 psia. Pressure drop through the piping system from the furthest storage tank to the flare was calculated and found to have a backpressure on the tank battery of 1.5 oz/in^2g.

During normal operating conditions the 1.5 oz/in^2g pressure should be the highest pressure that the tanks will see and the Enardo thief hatches will not open.

Calculations:

A flare tip pressure drop of 0.0 oz/in² was used and was based on information provided by Steffes Flare systems for the Air Assist Model 4. The flame arrestor pressure drop used was 0.168 oz/in² and is based on the Enardo sizing program for a 6" Series 8 inline flame arrestor.

The total gas flow rate to the flare used was 220 Mscfd and is based on a condensate flash factor and gas composition provided by Marathon Oil. The gas composition used was the average composition from the February 2017 Clarks Creek (MM) Analysis Summary. Credit was taken for the VRT thereby reducing the amount of flashed gas that was calculated using the provided flash gas factor.

Using the same calculation methodology, the total gas flow rate can be increased to approximately 722 Mscfd and stay at or below the opening pressure of an Enardo ES-660 thief hatch (14.4 oz/in²). This is approximately 3.28 times the normal operating flow. The crack pressure of the Enardo ES-660's was assumed to be 90% of the set pressure based on review of the device product data sheet.

Standard pressure drop "K" value for fittings and valves per Crane Technical Paper 410 were used. The value used for the absolute roughness of steel was 0.00015 ft.

**Attached are the tabulated results of the hydraulic calculations*

Disclaimer:

This assessment meets the certification requirements of 40 CFR part 60 subpart 0000a. It is the responsibility of *Marathon Oil* to comply with the reporting requirements of this regulation.

This evaluation does not consider the destructive efficiency of the control device or components upstream of the tank vent design.

RINGER CTB VENT LINE DESIGN AND CAPACITY ASSESSMENT

(b) (6) [redacted]

TO:	Marathon Oil
FROM:	Nigel Wang, Dylan Fortin
CC:	Jeff Wellen
DATE:	July 26, 2018
RE:	Ringer CTB - Vent Line Design and Capacity Assessment – Rev 0

The US EPA finalized "Standards of Performance for Crude Oil and Natural Gas Facilities for which Construction, Modification or Reconstruction Commenced After September 18, 2015" on June 3, 2016. This regulation has requirements for certifying the design of closed vent systems. An assessment of the closed vent must be performed to determine it is of sufficient design and capacity to ensure that all emissions from storage vessels are routed to the control device or process and have it certified by a qualified professional engineer. This regulation is 40 CFR 60 Subpart OOOOa, referred to as the OOOOa regulation.

Certification for 40 CFR 60.5411a(d):

"I certify that the closed vent system design and capacity assessment was prepared under my direction or supervision. I further certify that the closed vent system design and capacity assessment was conducted and this report was prepared pursuant to the requirements of subpart OOOOa of 40 CFR part 60. Based on my professional knowledge and experience, and inquiry of personnel involved in the assessment, the certification submitted herein is true, accurate, and complete. I am aware that there are penalties for knowingly submitting false information."

Purpose:

Evaluate the new Ringer CTB vent line design to ensure that the Enardo ES-660 thief hatches, which are set at 16 oz/in^2, will not open during normal operating flow rate scenarios. The normal flow path for the vapor from the storage tanks will be to one flare where the off gas will be combusted to meet OOOOa regulations.

Results:

Based on the vent system 3D model (dated April 11, 2018) and predicted vapor flow rates, Halker Consulting evaluated the pipe routing from the storage tanks to the flare and calculated the expected pressure drop in the system during the Marathon Oil specified predicted vapor flow rates. The pressure at the outlet of the flare was set at local atmospheric pressure of 13.7 psia. Pressure drop through the piping system from the furthest storage tank to the flare was calculated and found to have a backpressure on the tank battery of 6.6 oz/in^{2}g.

During normal operating conditions the 6.6 oz/in^{2}g pressure should be the highest pressure that the tanks will see and is 41.3% of the of 16 oz/in^{2}g set pressure of the thief hatch.

Calculations:

A flare tip pressure drop of 0.0 oz/in^2 was used and was based on information provided by Steffes Flare systems for the Air Assist Model 4. The flame arrestor pressure drop used was 0.616 oz/in^2 and is based on the Enardo sizing program for a 6" Series 8 inline flame arrestor.

The total gas flow rate to the flare used was 500 Mscfd, and is based on a condensate flash factor and gas composition provided by Marathon Oil. The gas composition used was the average composition from the February 2017 Clarks Creek (MM) Analysis Summary.

Using the same calculation methodology, the total gas flow rate can be increased to approximately 758 Mscfd and stay at or below the opening pressure of an Enardo ES-660 thief hatch (14.4 oz/in^2). This is approximately 1.52 times the normal operating flow.

Standard pressure drop "K" value for fittings and valves per Crane Technical Paper 410 were used. The value used for the absolute roughness of steel was 0.00015 ft.

**Attached are the tabulated results of the hydraulic calculations*

Disclaimer:

This assessment meets the certification requirements of 40 CFR part 60 subpart 0000a. It is the responsibility of *Marathon Oil* to comply with the reporting requirements of this regulation.

This evaluation does not consider the destructive efficiency of the control device or components upstream of the tank vent design.

SHOBE CTB VENT LINE DESIGN AND CAPACITY ASSESSMENT

TO:	Marathon Oil	(b) (6) [redacted]
FROM:	Nigel Wang, Dylan Fortin	
CC:	Jeff Wellen	
DATE:	July 25, 2018	
RE:	Shobe CTB - Vent Line Design and Capacity Assessment – Rev 0	

The US EPA finalized "Standards of Performance for Crude Oil and Natural Gas Facilities for which Construction, Modification or Reconstruction Commenced After September 18, 2015" on June 3, 2016. This regulation has requirements for certifying the design of closed vent systems. An assessment of the closed vent must be performed to determine it is of sufficient design and capacity to ensure that all emissions from storage vessels are routed to the control device or process and have it certified by a qualified professional engineer. This regulation is 40 CFR 60 Subpart OOOOa, referred to as the OOOOa regulation.

Certification for 40 CFR 60.5411a(d):

"I certify that the closed vent system design and capacity assessment was prepared under my direction or supervision. I further certify that the closed vent system design and capacity assessment was conducted and this report was prepared pursuant to the requirements of subpart OOOOa of 40 CFR part 60. Based on my professional knowledge and experience, and inquiry of personnel involved in the assessment, the certification submitted herein is true, accurate, and complete. I am aware that there are penalties for knowingly submitting false information."

Purpose:

Evaluate the new Shobe CTB vent line design to ensure that the Enardo ES-660 thief hatches, which are set at 16 oz/in^2, will not open during normal operating flow rate scenarios. The normal flow path for the vapor from the storage tanks will be to one flare where the off gas will be combusted to meet OOOOa regulations.

Results:

Based on the vent system 3D model (dated July 23, 2018) and predicted vapor flow rates, Halker Consulting valuated the pipe routing from the storage tanks to the flare and calculated the expected pressure drop in the system during the Marathon Oil specified predicted vapor flow rates. The pressure at the outlet of the flare was set at local atmospheric pressure of 13.7 psia. Pressure drop through the piping system from the furthest storage tank to the flare was calculated and found to have a backpressure on the tank battery of 5.9 oz/in^{2}g.

During normal operating conditions the 5.9 oz/in^{2}g pressure should be the highest pressure that the tanks will see and is 36.9% of the of 16 oz/in^{2}g set pressure of the thief hatch.

Calculations:

A flare tip pressure drop of 0.0 oz/in^2 was used and was based on information provided by Steffes Flare systems for the Air Assist Model 4. The flame arrestor pressure drop used was 0.835 oz/in^2 and is based on the Enardo sizing program for a 6" Series 8 inline flame arrestor.

The total gas flow rate to the flare used was 600 Mscfd, and is based on a condensate flash factor and gas composition provided by Marathon Oil. The gas composition used was the average composition from the February 2017 Clarks Creek (MM) Analysis Summary.

Using the same calculation methodology, the total gas flow rate can be increased to approximately 966 Mscfd and stay at or below the opening pressure of an Enardo ES-660 thief hatch (14.4 oz/in^2). This is approximately 1.61 times the normal operating flow.

Standard pressure drop "K" value for fittings and valves per Crane Technical Paper 410 were used. The value used for the absolute roughness of steel was 0.00015 ft.

**Attached are the tabulated results of the hydraulic calculations*

Disclaimer:

This assessment meets the certification requirements of 40 CFR part 60 subpart 0000a. It is the responsibility of *Marathon Oil* to comply with the reporting requirements of this regulation.

This evaluation does not consider the destructive efficiency of the control device or components upstream of the tank vent design.

TAT 13 CTB VENT LINE DESIGN AND CAPACITY ASSESSMENT

(b) (6) [redacted]

TO:	Marathon Oil
FROM:	Dylan Fortin
CC:	Jeff Wellen
DATE:	4/18/2018
RE:	TAT 13 CTB - Vent Line Design and Capacity Assessment

The US EPA finalized "Standards of Performance for Crude Oil and Natural Gas Facilities for which Construction, Modification or Reconstruction Commenced After September 18, 2015" on June 3, 2016. This regulation has requirements for certifying the design of closed vent systems. An assessment of the closed vent must be performed to determine it is of sufficient design and capacity to ensure that all emissions from storage vessels are routed to the control device or process and have it certified by a qualified professional engineer. This regulation is 40 CFR 60 Subpart OOOOa, referred to as the Quad Oa regulation.

Certification for 40 CFR 60.5411a(d):

"I certify that the closed vent system design and capacity assessment was prepared under my direction or supervision. I further certify that the closed vent system design and capacity assessment was conducted and this report was prepared pursuant to the requirements of subpart OOOOa of 40 CFR part 60. Based on my professional knowledge and experience, and inquiry of personnel involved in the assessment, the certification submitted herein is true, accurate, and complete. I am aware that there are penalties for knowingly submitting false information."

Purpose:

Evaluate the new TAT 13 CTB vent line design to ensure that the Enardo ES-660 thief hatches, which are set at 16 oz/in^2, will not open during normal operating flow rate scenarios. The TAT 13 CTB consists of one bulk and test tank battery, the TAT 13, and one section line well tank battery, the Loren. Each tank battery has its own vent line upstream of the flare scrubbers. Both vent lines commingle downstream of the flare scrubbers prior to being combusted by one flare to meet Quad Oa regulations.

Results:

Based on the vent system 3D model (dated 1/30/2018) and predicted vapor flow rates, Halker Consulting evaluated the pipe routing from the storage tanks to the flare and calculated the expected pressure drop in the system during the Marathon Oil specified predicted vapor flow rates. Since the TAT 13 CTB consists of two separate tank batteries which are commingled, two peak flow rates were analyzed. The calculated pressures at the furthest tank from the flare for each tank battery are reported below:

	Pressure [osig]	
Scenario	**TAT 13**	**Loren**
TAT 13 Peak	13.1	8.5
Loren Peak	6.6	9.6

Calculations:

The pressure at the outlet of the flare was set at local atmospheric pressure of 13.7 psia. A flare tip pressure drop of 0.0 oz/in^2 was used and was based on information provided by Steffes for the Air Assist Model 4. For the normal flow rate scenarios, the following flow rates were used to calculate flame arrestor pressure drops and tank pressures.

	Rate [Mscfd]			Enardo Series 8 Flame
Scenario	**TAT 13**	**Loren**	**Commingled**	**Arrestor dP [osi]**
TAT 13 Peak	365	362	727	1.1
Loren Peak	123	550	673	0.9

Gas flow rates were calculated based on a condensate flash factor and gas composition provided by Marathon Oil. The gas composition used was the average composition from the February 2017 Clarks Creek (MM) Analysis Summary. Credit was taken for the TAT 13 VRT thereby reducing the amount of flashed gas in the TAT 13 system that was calculated using the provided flash gas factor. Flame arrestor pressure drops were based on the ENARDOSoftCalcII sizing program.

Using the same calculation methodology, the total allowable gas flow rates were calculated such that the tank pressures remain below the opening pressure of an Enardo ES-660 thief hatch (14.4 oz/in^2). The maximum allowable flow rates are reported below and assume the other system flow rate remains constant as predicted.

Scenario	Rate [Mscfd]	% Greater than Predicted Peak
TAT 13 Max Allowable	390	107%
Loren Max Allowable	685	125%

Standard pressure drop "K" value for fittings and valves per Crane Technical Paper No. 410 were used. The value used for the absolute roughness of steel was 0.00015 ft.

**Attached are the tabulated results of the hydraulic calculations*

Disclaimer:

This assessment meets the certification requirements of 40 CFR part 60 subpart 0000a. It is the responsibility of *Marathon Oil* to comply with the reporting requirements of this regulation.

This evaluation does not consider the destructive efficiency of the control device or components upstream of the tank vent design.

TWO BAR CTB VENT LINE DESIGN AND CAPACITY ASSESSMENT

TO:	Marathon Oil	(b) (6) [redacted]
FROM:	Dylan Fortin, Will Myers	
CC:	Jeff Wellen	
DATE:	January 11, 2019	
RE:	Two Bar CTB - Vent Line Design and Capacity Assessment Rev 0	

The US EPA finalized "Standards of Performance for Crude Oil and Natural Gas Facilities for which Construction, Modification or Reconstruction Commenced After September 18, 2015" on June 3, 2016. This regulation has requirements for certifying the design of closed vent systems. An assessment of the closed vent must be performed to determine it is of sufficient design and capacity to ensure that all emissions from storage vessels are routed to the control device or process and have it certified by a qualified professional engineer. This regulation is 40 CFR 60 Subpart OOOOa, referred to as the OOOOa regulation.

Certification for 40 CFR 60.5411a(d):

"I certify that the closed vent system design and capacity assessment was prepared under my direction or supervision. I further certify that the closed vent system design and capacity assessment was conducted and this report was prepared pursuant to the requirements of subpart OOOOa of 40 CFR part 60. Based on my professional knowledge and experience, and inquiry of personnel involved in the assessment, the certification submitted herein is true, accurate, and complete. I am aware that there are penalties for knowingly submitting false information."

Purpose:

Evaluate the new Two Bar CTB vent line design to ensure that the Enardo ES-660 thief hatches, which are set at 16 oz/in^2, will not open during normal operating flow rate scenarios. The normal flow path for the vapor from the storage tanks will be to one flare where the off gas will be combusted to meet OOOOa regulations.

Results:

Based on the vent system in the Two Bar CTB Rev 0 3D model (transmitted January 3, 2019) and predicted vapor flow rates, Halker Consulting evaluated the pipe routing from the storage tanks to the flare and calculated the expected pressure drop in the system during the Marathon Oil specified maximum predicted vapor flow rates. The pressure at the outlet of the flare was set at local atmospheric pressure of 13.7 psia. Pressure drop through the piping system from the furthest storage tank to the flare was calculated and found to have a backpressure on the tank battery of 1.3 oz/in^{2}g.

During normal operating conditions the 1.3 oz/in^{2}g pressure should be the highest pressure that the tanks will see and the Enardo thief hatches will not open.

Calculations:

A flare tip pressure drop of 0.0 oz/in^2 was used and was based on information provided by Steffes Flare systems for the Air Assist Model 4. The flame arrestor pressure drop used was 0.164 oz/in^2 and is based on the Enardo sizing program for a 6" Series 8 inline flame arrestor.

The total gas flow rate to the flare used was 216 Mscfd and is based on a condensate flash factor and gas composition provided by Marathon Oil. The gas composition used was the average composition from the February 2017 Clarks Creek (MM) Analysis Summary. Credit was taken for the VRT thereby reducing the amount of flashed gas that was calculated using the provided flash gas factor.

Using the same calculation methodology, the total gas flow rate can be increased to approximately 772 Mscfd and stay at or below the opening pressure of an Enardo ES-660 thief hatch (14.4 oz/in^2). This is approximately 3.57 times the normal operating flow. The crack pressure of the Enardo ES-660's was assumed to be 90% of the set pressure based on review of the device product data sheet.

Standard pressure drop "K" value for fittings and valves per Crane Technical Paper 410 were used. The value used for the absolute roughness of steel was 0.00015 ft.

**Attached are the tabulated results of the hydraulic calculations*

Disclaimer:

This assessment meets the certification requirements of 40 CFR part 60 subpart 0000a. It is the responsibility of *Marathon Oil* to comply with the reporting requirements of this regulation.

This evaluation does not consider the destructive efficiency of the control device or components upstream of the tank vent design.

YELLOW OTTER CTB VENT LINE DESIGN AND CAPACITY ASSESSMENT

TO:	Marathon Oil	(b) (6) [redacted]
FROM:	KC Agwu, Dylan Fortin	
CC:	Jeff Wellen	
DATE:	November 15, 2018	
RE:	Yellow Otter CTB - Vent Line Design and Capacity Assessment Rev 0	

The US EPA finalized "Standards of Performance for Crude Oil and Natural Gas Facilities for which Construction, Modification or Reconstruction Commenced After September 18, 2015" on June 3, 2016. This regulation has requirements for certifying the design of closed vent systems. An assessment of the closed vent must be performed to determine it is of sufficient design and capacity to ensure that all emissions from storage vessels are routed to the control device or process and have it certified by a qualified professional engineer. This regulation is 40 CFR 60 Subpart OOOOa, referred to as the OOOOa regulation.

Certification for 40 CFR 60.5411a(d):

"I certify that the closed vent system design and capacity assessment was prepared under my direction or supervision. I further certify that the closed vent system design and capacity assessment was conducted and this report was prepared pursuant to the requirements of subpart OOOOa of 40 CFR part 60. Based on my professional knowledge and experience, and inquiry of personnel involved in the assessment, the certification submitted herein is true, accurate, and complete. I am aware that there are penalties for knowingly submitting false information."

Purpose:

Evaluate the new Yellow Otter CTB vent line design to ensure that the Enardo ES-660 thief hatches, which are set at 16 oz/in^2, will not open during normal operating flow rate scenarios. Yellow Otter CTB consists of of a bulk and test facility (Yellow Otter) and a section line facility (Walking Eagle). Each facility has its own tank battery, tank vent line, and flare scrubbers. Both facility vent lines commingle downstream of the flare scrubbers prior to being combusted by two low pressure flares to meet OOOOa regulations.

Results:

Based on the vent system in the Yellow Otter CTB Rev 1 3D model (transmitted November 2, 2018) and predicted vapor flow rates, Halker Consulting evaluated the pipe routing from the storage tanks to the flares and calculated the expected pressure drop in the system during the Marathon Oil specified maximum predicted vapor flow rates. The pressure at the outlet of the flare was set at local atmospheric pressure of 13.7 psia. Since Yellow Otter consists of two separate tank batteries which are commingled, two different tank battery pressures were calculated. For normal predicted peak flow rate scenarios (Attachment 1), the calculated pressures at the farthest tanks for the Yellow Otter and Walking Eagle tank batteries are 7.3 and 8.8 oz/in^2g respectively.

During normal operating conditions the Enardo thief hatches will not open.

ZELDA CTB VENT LINE DESIGN AND CAPACITY ASSESSMENT

TO:	Marathon Oil	[redacted]
FROM:	Nigel Wang, Dylan Fortin	
CC:	Jeff Wellen	
DATE:	September 7, 2018	
RE:	Zelda CTB - Vent Line Design and Capacity Assessment Rev. 0	

The US EPA finalized "Standards of Performance for Crude Oil and Natural Gas Facilities for which Construction, Modification or Reconstruction Commenced After September 18, 2015" on June 3, 2016. This regulation has requirements for certifying the design of closed vent systems. An assessment of the closed vent must be performed to determine it is of sufficient design and capacity to ensure that all emissions from storage vessels are routed to the control device or process and have it certified by a qualified professional engineer. This regulation is 40 CFR 60 Subpart OOOOa, referred to as the OOOOa regulation.

Certification for 40 CFR 60.5411a(d):

"I certify that the closed vent system design and capacity assessment was prepared under my direction or supervision. I further certify that the closed vent system design and capacity assessment was conducted and this report was prepared pursuant to the requirements of subpart OOOOa of 40 CFR part 60. Based on my professional knowledge and experience, and inquiry of personnel involved in the assessment, the certification submitted herein is true, accurate, and complete. I am aware that there are penalties for knowingly submitting false information."

Purpose:

Evaluate the new Zelda CTB vent line design to ensure that the Enardo ES-660 thief hatches, which are set at 16 oz/in^2, will not open during normal operating flow rate scenarios. The normal flow path for the vapor from the storage tanks will be to one flare where the off gas will be combusted to meet OOOOa regulations.

Results:

Based on the vent system 3D model (dated August 23, 2018) and predicted vapor flow rates, Halker Consulting evaluated the pipe routing from the storage tanks to the flare and calculated the expected pressure drop in the system during the Marathon Oil specified predicted vapor flow rates. The pressure at the outlet of the flare was set at local atmospheric pressure of 13.7 psia. Pressure drop through the piping system from the furthest storage tank to the flare was calculated and found to have a backpressure on the tank battery of 7.5 oz/in^{2}g.

During normal operating conditions the 7.5 oz/in^{2}g pressure should be the highest pressure that the tanks will see and is 46.9% of the of 16 oz/in^{2}g set pressure of the thief hatch.

ANNIE CTB VENT LINE DESIGN AND CAPACITY ASSESSMENT

TO:	Marathon Oil
FROM:	Nigel Wang, Dylan Fortin
CC:	Jeff Wellen
DATE:	September 26, 2018
RE:	Annie CTB - Vent Line Design and Capacity Assessment Rev. 0

(b) (6) [redacted]

The US EPA finalized "Standards of Performance for Crude Oil and Natural Gas Facilities for which Construction, Modification or Reconstruction Commenced After September 18, 2015" on June 3, 2016. This regulation has requirements for certifying the design of closed vent systems. An assessment of the closed vent must be performed to determine it is of sufficient design and capacity to ensure that all emissions from storage vessels are routed to the control device or process and have it certified by a qualified professional engineer. This regulation is 40 CFR 60 Subpart OOOOa, referred to as the OOOOa regulation.

Certification for 40 CFR 60.5411a(d):

"I certify that the closed vent system design and capacity assessment was prepared under my direction or supervision. I further certify that the closed vent system design and capacity assessment was conducted and this report was prepared pursuant to the requirements of subpart OOOOa of 40 CFR part 60. Based on my professional knowledge and experience, and inquiry of personnel involved in the assessment, the certification submitted herein is true, accurate, and complete. I am aware that there are penalties for knowingly submitting false information."

Purpose:

Evaluate the new Annie CTB vent line design to ensure that the Enardo ES-660 thief hatches, which are set at 16 oz/in^2, will not open during normal operating flow rate scenarios. The normal flow path for the vapor from the storage tanks will be to one flare where the off gas will be combusted to meet OOOOa regulations.

Results:

Based on the vent system 3D model (dated September 12, 2018) and predicted vapor flow rates, Halker Consulting evaluated the pipe routing from the storage tanks to the flare and calculated the expected pressure drop in the system during the Marathon Oil specified predicted vapor flow rates. The pressure at the outlet of the flare was set at local atmospheric pressure of 13.7 psia. Pressure drop through the piping system from the furthest storage tank to the flare was calculated and found to have a backpressure on the tank battery of 5.7 oz/in^{2}g.

During normal operating conditions the 5.7 oz/in^{2}g pressure should be the highest pressure that the tanks will see and is 36% of the of 16 oz/in^{2}g set pressure of the thief hatch.

Calculations:

A flare tip pressure drop of 0.0 oz/in^2 was used and was based on information provided by Steffes Flare systems for the Air Assist Model 4. The flame arrestor pressure drop used was 0.835 oz/in^2 and is based on the Enardo sizing program for a 6" Series 8 inline flame arrestor.

The total gas flow rate to the flare used was 600 Mscfd, and is based on a condensate flash factor and gas composition provided by Marathon Oil. The gas composition used was the average composition from the February 2017 Clarks Creek (MM) Analysis Summary.

Using the same calculation methodology, the total gas flow rate can be increased to approximately 975 Mscfd and stay at or below the opening pressure of an Enardo ES-660 thief hatch (14.4 oz/in^2). This is approximately 1.6 times the normal operating flow.

Standard pressure drop "K" value for fittings and valves per Crane Technical Paper 410 were used. The value used for the absolute roughness of steel was 0.00015 ft.

**Attached are the tabulated results of the hydraulic calculations*

Disclaimer:

This assessment meets the certification requirements of 40 CFR part 60 subpart 0000a. It is the responsibility of *Marathon Oil* to comply with the reporting requirements of this regulation.

This evaluation does not consider the destructive efficiency of the control device or components upstream of the tank vent design.

BIG HEAD CTB VENT LINE DESIGN AND CAPACITY ASSESSMENT

TO:	Marathon Oil
FROM:	KC Agwu, Dylan Fortin
CC:	Jeff Wellen
DATE:	November 14, 2018
RE:	Big Head CTB - Vent Line Design and Capacity Assessment Rev 0

PROFESSIO (b) (6) [redacted]

The US EPA finalized "Standards of Performance for Crude Oil and Natural Gas Facilities for which Construction, Modification or Reconstruction Commenced After September 18, 2015" on June 3, 2016. This regulation has requirements for certifying the design of closed vent systems. An assessment of the closed vent must be performed to determine it is of sufficient design and capacity to ensure that all emissions from storage vessels are routed to the control device or process and have it certified by a qualified professional engineer. This regulation is 40 CFR 60 Subpart OOOOa, referred to as the OOOOa regulation.

Certification for 40 CFR 60.5411a(d):

"I certify that the closed vent system design and capacity assessment was prepared under my direction or supervision. I further certify that the closed vent system design and capacity assessment was conducted and this report was prepared pursuant to the requirements of subpart OOOOa of 40 CFR part 60. Based on my professional knowledge and experience, and inquiry of personnel involved in the assessment, the certification submitted herein is true, accurate, and complete. I am aware that there are penalties for knowingly submitting false information."

Purpose:

Evaluate the new Big Head CTB vent line design to ensure that the Enardo ES-660 thief hatches, which are set at 16 oz/in^2, will not open during normal operating flow rate scenarios. Big Head CTB consists of of a bulk and test facility (Big Head) and a section line facility (Birds Bill). Each facility has its own tank battery, tank vent line, and flare scrubbers. Both facility vent lines commingle downstream of the flare scrubbers prior to being combusted by two low pressure flares to meet OOOOa regulations.

Results:

Based on the vent system in the Big Head CTB Rev 0 3D model (transmitted October 25, 2018) and predicted vapor flow rates, Halker Consulting evaluated the pipe routing from the storage tanks to the flares and calculated the expected pressure drop in the system during the Marathon Oil specified maximum predicted vapor flow rates. The pressure at the outlet of the flare was set at local atmospheric pressure of 13.7 psia. Since Big Head consists of two separate tank batteries which are commingled, two different tank battery pressures were calculated. For normal predicted peak flow rate scenarios (Attachment 1), the calculated pressures at the farthest tanks for the Big Head and Birds Bill tank batteries are 6.9 and 8.1 oz/in^{2}g respectively.

During normal operating conditions the Enardo thief hatches will not open.

Calculations:

A flare tip pressure drop of 0.0 oz/in² was used and was based on information provided by Steffes Flare systems for the Air Assist Model 4. The flame arrestor pressure drop used was 2.22 oz/in² and is based on the Enardo sizing program for a 4" Series 8 inline flame arrestor.

The total gas flow rate to the flares used was 840 Mscfd and is based on a condensate flash factor and gas composition provided by Marathon Oil. The gas composition used was the average composition from the February 2017 Clarks Creek (MM) Analysis Summary.

Using the same calculation methodology, the total allowable gas flow rates were calculated such that the tank pressures stay at or below the opening pressure of an Enardo ES-660 thief hatch (14.4 oz/in²). The crack pressure of the Enardo ES-660s were assumed to be 90% of the set pressure based on review of the device product data sheet. The maximum allowable flow rates are reported below and assume the other facility flow rate remains constant as predicted.

Facility Scenario	Individual System Flow Rate [Mscfd]	Total System Flow Rate [Mscfd]	% of Individual System Predicted Peak
Big Head Maximum Allowable	775	1095	149%
Birds Bill Maximum Allowable	650	1170	203%

For the listed maximum allowable rate, the flow rate from the other system was held constant at predicted peak rate.

Standard pressure drop "K" value for fittings and valves per Crane Technical Paper 410 were used. The value used for the absolute roughness of steel was 0.00015 ft.

**Attached are the tabulated results of the hydraulic calculations*

Disclaimer:

This assessment meets the certification requirements of 40 CFR part 60 subpart 0000a. It is the responsibility of *Marathon Oil* to comply with the reporting requirements of this regulation.

This evaluation does not consider the destructive efficiency of the control device or components upstream of the tank vent design.

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7936 E. Arapahoe Ct., Suite 3200
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303-515-2700

Bear Den Facility Tank Battery Vent Line Design & Capacity Assessment

TO:	Marathon Oil
FROM:	Tim Archuleta
CC:	Nate Mascarenas, Kendra Meeker
DATE:	June 29, 2017
RE:	Bear Den Facility- Vent Line Design and Capacity Assessment

(b) (6) [redacted]

The US EPA finalized "Standards of Performance for Crude Oil and Natural Gas Facilities for which Construction, Modification or Reconstruction Commenced After September 18, 2015" on June 3, 2016. This regulation has requirements for certifying the design of closed vent systems. An assessment of the closed vent must be performed to determine it is of sufficient design and capacity to ensure that all emissions from storage vessels are routed to the control device or process and have it certified by a qualified professional engineer. This regulation is 40 CFR 40 Subpart OOOOa, referred to as the Quad Oa regulation.

Certification for 40 CFR 60.5411a(d):

"I certify that the closed vent system design and capacity assessment was prepared under my direction or supervision. I further certify that the closed vent system design and capacity assessment was conducted and this report was prepared pursuant to the requirements of subpart Quad Oa of 40 CFR part 60. Based on my professional knowledge and experience, and inquiry of personnel involved in the assessment, the certification submitted herein is true, accurate, and complete. I am aware that there are penalties for knowingly submitting false information."

Purpose:

Evaluate the new Bear Den Facility tank battery vent line design to ensure that the Enardo ES-660 thief hatches, which are set at 16 oz/in^2 will not open during normal operating flow rate scenarios. The normal flow path for the vapor from the storage tanks will be to one flare where the off gas will be combusted to meet Quad Oa regulations.

Results:

Based on the 3D model of the vent system and predicted vapor flow rates, Halker Consulting evaluated the pipe routing from the storage tanks to the flare and calculated the expected pressure drop in the system during the Marathon Oil specified maximum predicted vapor flow rates. The pressure at the outlet of the flare was set at local atmospheric pressure of approximately 13.5 psia. Pressure drop through the piping system from the furthest storage tank to the flare was calculated and found to have a backpressure on the tank battery of 0.4 psig (6.1 oz/in^{2}g).

During normal operating conditions, 6.1 oz/in^{2}g pressure should be the highest pressure that the tanks will see and is 40% of the of 16 oz/in^{2}g set pressure of the thief hatch.

Calculations:

A flare tip pressure drop of 0.0 oz/in² was used and was based on information provided by Steffes Flare systems for the Air Assist Model 4. The flame arrestor pressure drop used was 0.9 oz/in² and is based on the Enardo sizing program for a 4" Series 8 inline flame arrestor.

The total gas flow rate to the flare used was 241 mscfd (771 lb/hr), and is based on a condensate flash factor and gas composition provided by Marathon Oil. The gas composition used was the average composition from the February 2017 Clarks Creek (MM) Analysis Summary. Credit was taken for the VRT thereby reducing the amount of flashed gas that was calculated using the provided flash gas factor.

Using the same calculation methodology, the total gas flow rate can be increased to 380 MSCFD (1216 lb/hr) and stay below the opening pressure of an Enardo ES-660 thief hatch (14.4 oz/in²). This is approximately 1.57 times the normal operating flow.

Standard pressure drop "K" value for fittings and valves per Crane Technical Paper 410 were used. The value used for the absolute roughness of steel was 0.00015 ft.

**Attached are the tabulated results of the hydraulic calculations*

Disclaimer:

This assessment meets the certification requirements of 40 CFR part 60 subpart 0000a. It is the responsibility of *Marathon Oil* to comply with the reporting requirements of this regulation.

This evaluation does not consider the destructive efficiency of the controlled device or components upstream of the tank vent design.

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303-515-2700

BECK FACILITY TANK BATTERY VENT LINE DESIGN AND CAPACITY ASSESSMENT

TO:	Marathon Oil	[redacted]
FROM:	John Van Pelt	
CC:	Tim Archuleta, Nate Mascarenas, Kendra Meeker	
DATE:	June 12, 2017	
RE:	BECK Facility- Vent Line Design and Capacity Assessment	

The US EPA finalized "Standards of Performance for Crude Oil and Natural Gas Facilities for which Construction, Modification or Reconstruction Commenced After September 18, 2015" on June 3, 2016. This regulation has requirements for certifying the design of closed vent systems. An assessment of the closed vent must be performed to determine it is of sufficient design and capacity to ensure that all emissions from storage vessels are routed to the control device or process and have it certified by a qualified professional engineer. This regulation is 40 CFR 40 Subpart OOOOa, referred to as the Quad Oa regulation.

Certification for 40 CFR 60.5411a(d):

"I certify that the closed vent system design and capacity assessment was prepared under my direction or supervision. I further certify that the closed vent system design and capacity assessment was conducted and this report was prepared pursuant to the requirements of subpart Quad Oa of 40 CFR part 60. Based on my professional knowledge and experience, and inquiry of personnel involved in the assessment, the certification submitted herein is true, accurate, and complete. I am aware that there are penalties for knowingly submitting false information."

Purpose:

Evaluate the new Beck facility tank battery vent line design to ensure that the Enardo ES-660 thief hatches, which are set at 16 oz/in² will not open during normal operating flow rate scenarios. The normal flow path for the vapor from the storage tanks will be to one flare where the off gas will be combusted to meet Quad Oa regulations.

Results:

Based on the 3D model of the vent system and predicted vapor flow rates, Halker Consulting evaluated the pipe routing from the storage tanks to the flare and calculated the expected pressure drop in the system during the Marathon Oil specified maximum predicted vapor flow rates. The pressure at the outlet of the flare was set at local atmospheric pressure of approximately 13.46 psia. Pressure drop through the piping system from the furthest storage tank to the flare was calculated and found to have a backpressure on the tank battery of 0.24 psig (3.9 oz/in²g).

During normal operating conditions the 3.9 oz/in²g pressure should be the highest pressure that the tanks will see and is 24% of the of 16 oz/in²g set pressure of the thief hatch.

Calculations:

A flare tip pressure drop of 0.0 oz/in^2 was used and was based on information provided by Steffes Flare systems for the Air Assist Model 4. The flame arrestor pressure drop used was 0.72 oz/in^2 and is based on the Enardo sizing program for a 4" Series 8 inline flame arrestor.

The total gas flow rate to the flare used was 213 mscfd (683 lb/hr), and is based on a condensate flash factor and gas composition provided by Marathon Oil. The gas composition used was the average composition from the February 2017 Clarks Creek (MM) Analysis Summary. Credit was taken for the VRT thereby reducing the amount of flashed gas that was calculated using the provided flash gas factor.

Using the same calculation methodology, the total gas flow rate can be increased to 436 MSCFD (1396 lb/hr) and stay below the opening pressure of an Enardo ES-660 thief hatch (14.4 oz/in^2). This is approximately 2.04 times the normal operating flow.

Standard pressure drop "K" value for fittings and valves per Crane Technical Paper 410 were used. The value used for the absolute roughness of steel was 0.00015 ft.

**Attached are the tabulated results of the hydraulic calculations*

Disclaimer:

This assessment meets the certification requirements of 40 CFR part 60 subpart 0000a. It is the responsibility of *Marathon Oil* to comply with the reporting requirements of this regulation.

This evaluation does not consider the destructive efficiency of the controlled device or components upstream of the tank vent design.

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7936 E. Arapahoe Ct., Suite 3200
Centennial, CO 80112
303-515-2700

GRADY FACILITY TANK BATTERY VENT LINE DESIGN AND CAPACITY ASSESSMENT

TO:	Marathon Oil
FROM:	Tim Archuleta
CC:	Craig Melton, Andrew Depperschmidt
DATE:	January 13, 2017
RE:	Grady Facility- Vent Line Design and Capacity Assessment

(b) (6) [redacted]

The US EPA finalized "Standards of Performance for Crude Oil and Natural Gas Facilities for which Construction, Modification or Reconstruction Commenced After September 18, 2015" on June 3, 2016. This regulation has requirements for certifying the design of closed vent systems. An assessment of the closed vent must be performed to determine it is of sufficient design and capacity to ensure that all emissions from storage vessels are routed to the control device or process and have it certified by a qualified professional engineer. This regulation is 40 CFR 40 Subpart OOOOa, referred to as the Quad Oa regulation.

Certification for 40 CFR 60.5411a(d):

"I certify that the closed vent system design and capacity assessment was prepared under my direction or supervision. I further certify that the closed vent system design and capacity assessment was conducted and this report was prepared pursuant to the requirements of subpart Quad Oa of 40 CFR part 60. Based on my professional knowledge and experience, and inquiry of personnel involved in the assessment, the certification submitted herein is true, accurate, and complete. I am aware that there are penalties for knowingly submitting false information."

Purpose:

Evaluate the new Grady facility tank battery vent line design to ensure that the thief hatches, which are set at 16 oz/in^2 will not open during normal operating flow rate scenarios. The normal flow path for the vapor from the storage tanks will be to one flare where the off gas will be combusted to meet Quad Oa regulations.

Results:

Based on the Marathon Oil verified tank orthos and predicted vapor flow rates, Halker Consulting evaluated the pipe routing from the storage tanks to the flare and calculated the expected pressure drop in the system during the Marathon Oil specified maximum predicted vapor flow rates. The pressure at the outlet of the flare was set at local atmospheric pressure of approximately 13.46 psia. Pressure drop through the piping system from the furthest storage tank to the flare was calculated and found to have a backpressure on the tank battery of 0.55 psig (8.8 oz/in^2).

During normal operating conditions the 8.8 oz/in^2g pressure should be the highest pressure that the tanks will see and is 55% of the of 16 oz/in^2g set pressure of the thief hatch.

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Centennial, CO 80112
303-515-2700

Observation:

In order to minimize the backpressure on the tanks and therefore minimize the possibility of venting uncombusted vapors, Halker recommends not installing inline components that add additional pressure drop through the tank vapor system including, but not limited to: swing check valves, pressure control devices, and unnecessary ball, gate, or globe valves. Additionally, routing the tank vapor system in a manner that does not allow liquids to build up inside the pipeline allows for minimizing pressure drop through the system by being able to utilize the entire cross sectional area of the piping configuration as well as minimizing the possibility of sending liquids to the flare.

Calculations:

A flare tip pressure drop of 0.5 oz/in^2 was used and was based on information provided by Steffes Flare systems for the Air Assist Model 4. The flame arrestor pressure drop used was 1.1 oz/in^2 and is based on the Enardo sizing program for a 4" Series 8 inline flame arrestor.

The total gas flow rate to the flare used was 230 mscfd (1097 lb/hr), and is based on a condensate flash factor provided by Marathon Oil. Credit was taken for the VRT thereby reducing the amount of flashed gas that was calculated using the provided flash gas factor.

Standard pressure drop "K" value for fittings and valves per Crane Technical Paper 410 were used. The value used for the absolute roughness of steel was 0.00015 ft.

**Attached are the tabulated results of the hydraulic calculations and the vent isometric drawing.*

Disclaimer:

This assessment meets the certification requirements of 40 CFR part 60 subpart 0000a. It is the responsibility of *Marathon Oil* to comply with the reporting requirements of this regulation.

This evaluation does not take into account the destructive efficiency of the controlled device or components upstream of the tank vent design.

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Centennial, CO 80112
303-515-2700

GRADY FACILITY TANK BATTERY VENT LINE DESIGN AND CAPACITY ASSESSMENT

TO:	Marathon Oil	(b) (6) [redacted]
FROM:	Tim Archuleta	
CC:	Nate Mascarenas, Kendra Meeker	
DATE:	July 21, 2017	
RE:	Grady Facility- Vent Line Design and Capacity Assessment	

The US EPA finalized "Standards of Performance for Crude Oil and Natural Gas Facilities for which Construction, Modification or Reconstruction Commenced After September 18, 2015" on June 3, 2016. This regulation has requirements for certifying the design of closed vent systems. An assessment of the closed vent must be performed to determine it is of sufficient design and capacity to ensure that all emissions from storage vessels are routed to the control device or process and have it certified by a qualified professional engineer. This regulation is 40 CFR 40 Subpart OOOOa, referred to as the Quad Oa regulation.

Certification for 40 CFR 60.5411a(d):

"I certify that the closed vent system design and capacity assessment was prepared under my direction or supervision. I further certify that the closed vent system design and capacity assessment was conducted and this report was prepared pursuant to the requirements of subpart Quad Oa of 40 CFR part 60. Based on my professional knowledge and experience, and inquiry of personnel involved in the assessment, the certification submitted herein is true, accurate, and complete. I am aware that there are penalties for knowingly submitting false information."

Purpose:

Evaluate the new Grady facility tank battery vent line design to ensure that the thief hatches, which are set at 16 oz/in^2, will not open during normal operating flow rate scenarios. The normal flow path for the vapor from the storage tanks will be to one flare where the off gas will be combusted to meet Quad Oa regulations.

Results:

Based on the Marathon Oil verified tank orthos and predicted vapor flow rates, Halker Consulting evaluated the pipe routing from the storage tanks to the flare and calculated the expected pressure drop in the system during the Marathon Oil specified maximum predicted vapor flow rates. The pressure at the outlet of the flare was set at local atmospheric pressure of approximately 13.46 psia. Pressure drop through the piping system from the furthest storage tank to the flare was calculated and found to have a backpressure on the tank battery of 0.36 psig (5.5 oz/in^2).

During normal operating conditions the 5.5 oz/in^{2}g pressure should be the highest pressure that the tanks will see and is 36% of the of 16 oz/in^{2}g set pressure of the thief hatch.

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Centennial, CO 80112
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Calculations:

A flare tip pressure drop of 0 oz/in² was used and was based on information provided by Steffes Flare systems for the Air Assist Model 4. The flame arrestor pressure drop used was 1.1 oz/in² and is based on the Enardo sizing program for a 4" Series 8 inline flame arrestor.

The total gas flow rate to the flare used was 278 Mscfd (890 lb/hr), and is based on a condensate flash factor provided by Marathon Oil. The gas composition used was the average composition from the February 2017 Clarks Creek (MM) Analysis Summary. Credit was taken for the VRT thereby reducing the amount of flashed gas that was calculated using the provided flash gas factor.

Using the same calculation methodology, the total gas flow rate can be increased to approximately 455 Mscfd and stay below the opening pressure of an Enardo ES-660 thief hatch (14.4 oz/in²). This is approximately 1.63 times the normal operating flow.

Standard pressure drop "K" value for fittings and valves per Crane Technical Paper 410 were used. The value used for the absolute roughness of steel was 0.00015 ft.

**Attached are the tabulated results of the hydraulic calculations and the vent isometric drawing.*

Disclaimer:

This assessment meets the certification requirements of 40 CFR part 60 subpart 0000a. It is the responsibility of *Marathon Oil* to comply with the reporting requirements of this regulation.

This evaluation does not take into account the destructive efficiency of the controlled device or components upstream of the tank vent design.

GRAVEL COULEE CTB VENT LINE DESIGN AND CAPACITY ASSESSMENT

TO:	Marathon Oil	(b) (6) [redacted]
FROM:	Tim Archuleta	
CC:	Nate Mascarenas, Kendra Meeker	
DATE:	November 9, 2017	
RE:	Gravel Coulee CTB - Vent Line Design and Capacity Assessment – Rev 1	

The US EPA finalized "Standards of Performance for Crude Oil and Natural Gas Facilities for which Construction, Modification or Reconstruction Commenced After September 18, 2015" on June 3, 2016. This regulation has requirements for certifying the design of closed vent systems. An assessment of the closed vent must be performed to determine it is of sufficient design and capacity to ensure that all emissions from storage vessels are routed to the control device or process and have it certified by a qualified professional engineer. This regulation is 40 CFR 40 Subpart OOOOa, referred to as the Quad Oa regulation.

Certification for 40 CFR 60.5411a(d):

"I certify that the closed vent system design and capacity assessment was prepared under my direction or supervision. I further certify that the closed vent system design and capacity assessment was conducted and this report was prepared pursuant to the requirements of subpart Quad Oa of 40 CFR part 60. Based on my professional knowledge and experience, and inquiry of personnel involved in the assessment, the certification submitted herein is true, accurate, and complete. I am aware that there are penalties for knowingly submitting false information."

Purpose:

Evaluate the new Gravel Coulee CTB vent line design to ensure that the Enardo ES-660 thief hatches, which are set at 16 oz/in^2, will not open during normal operating flow rate scenarios. The normal flow path for the vapor from the storage tanks will be to one flare where the off gas will be combusted to meet Quad Oa regulations. This revision reflects two changes from the previous revision: (1) a GOR reduction from 150 scf/bbl to 100 scf/bbl; and (2) separation of the LP gas and VRT gas so that the LP gas goes to one flare to be combusted and the VRT gas goes to a separate flare. In the prior revision LP tank gas and VRT gas were commingled and combusted in one flare.

Results:

Based on the vent system 3D model (A_GRAVELCOULEE_CTB_10-25-17.nwd) and predicted vapor flow rates, Halker Consulting evaluated the pipe routing from the storage tanks to the flare and calculated the expected pressure drop in the system during the Marathon Oil specified maximum predicted vapor flow rates. The pressure at the outlet of the flare was set at local atmospheric pressure of 13.7 psia. Pressure drop through the piping system from the furthest storage tank to the flare was calculated and found to have a backpressure on the tank battery of 3.5 oz/in^{2}g.

During normal operating conditions, 3.5 oz/in^{2}g pressure should be the highest pressure that the tanks will see and is 22% of the of 16 oz/in^{2}g set pressure of the thief hatch.

Calculations:

A flare tip pressure drop of 0.0 oz/in^2 was used and was based on information provided by Steffes Flare systems for the Air Assist Model 4. The flame arrestor pressure drop used was 0.45 oz/in^2 and is based on a quadratic line of best fit generated using the Enardo sizing program for a 4" Series 8 inline flame arrestor.

The total gas flow rate to the flare used was 186 Mscfd (595 lb/hr), and is based on a condensate flash factor and gas composition provided by Marathon Oil. The gas composition used was the average composition from the February 2017 Clarks Creek (MM) Analysis Summary. Credit was taken for the VRT thereby reducing the amount of flashed gas flowing through the tank vent lines.

Using the same calculation methodology, the total gas flow rate can be increased to approximately 390 Mscfd (1,248 lb/hr) and stay at or below the opening pressure of an Enardo ES-660 thief hatch (14.4 oz/in^2). This is approximately 210% of the normal operating flow.

Standard pressure drop "K" value for fittings and valves per Crane Technical Paper 410 were used. The value used for the absolute roughness of steel was 0.0005 ft.

**Attached are the tabulated results of the hydraulic calculations*

Disclaimer:

This assessment meets the certification requirements of 40 CFR part 60 subpart 0000a. It is the responsibility of *Marathon Oil* to comply with the reporting requirements of this regulation.

This evaluation does not consider the destructive efficiency of the controlled device or components upstream of the tank vent design.

HUGO CTB VENT LINE DESIGN AND CAPACITY ASSESSMENT

TO:	Marathon Oil	(b) (6) [redacted]
FROM:	Tim Archuleta	
CC:	Nate Mascarenas, Kendra Meeker	
DATE:	November 9, 2017	
RE:	Hugo CTB - Vent Line Design and Capacity Assessment	

The US EPA finalized "Standards of Performance for Crude Oil and Natural Gas Facilities for which Construction, Modification or Reconstruction Commenced After September 18, 2015" on June 3, 2016. This regulation has requirements for certifying the design of closed vent systems. An assessment of the closed vent must be performed to determine it is of sufficient design and capacity to ensure that all emissions from storage vessels are routed to the control device or process and have it certified by a qualified professional engineer. This regulation is 40 CFR 40 Subpart OOOOa, referred to as the Quad Oa regulation.

Certification for 40 CFR 60.5411a(d):

"I certify that the closed vent system design and capacity assessment was prepared under my direction or supervision. I further certify that the closed vent system design and capacity assessment was conducted and this report was prepared pursuant to the requirements of subpart Quad Oa of 40 CFR part 60. Based on my professional knowledge and experience, and inquiry of personnel involved in the assessment, the certification submitted herein is true, accurate, and complete. I am aware that there are penalties for knowingly submitting false information."

Purpose:

Evaluate the new Hugo CTB vent line design to ensure that the Enardo ES-660 thief hatches, which are set at 16 oz/in^2, will not open during normal operating flow rate scenarios. The normal flow path for the vapor from the storage tanks will be to one flare where the off gas will be combusted to meet Quad Oa regulations.

Results:

Based on the vent system 3D model (HUGO_CTB_REVA_11-02-17_issue.nwd) and predicted vapor flow rates, Halker Consulting evaluated the pipe routing from the storage tanks to the flare and calculated the expected pressure drop in the system during the Marathon Oil specified maximum predicted vapor flow rates. The pressure at the outlet of the flare was set at local atmospheric pressure of 13.7 psia. Pressure drop through the piping system from the furthest storage tank to the flare was calculated and found to have a backpressure on the tank battery of 3 oz/in^{2}g.

During normal operating conditions the 3 oz/in^{2}g pressure should be the highest pressure that the tanks will see and is 19% of the of 16 oz/in^{2}g set pressure of the thief hatch.

Calculations:

A flare tip pressure drop of 0.0 oz/in^2 was used and was based on information provided by Steffes Flare systems for the Air Assist Model 4. The flame arrestor pressure drop used was 0.38 oz/in^2 and is based on a quadratic line of best fit generated using the Enardo sizing program for a 4" Series 8 inline flame arrestor.

The total gas flow rate to the flare used was 162 Mscfd (518 lb/hr), and is based on a condensate flash factor and gas composition provided by Marathon Oil. The gas composition used was the average composition from the February 2017 Clarks Creek (MM) Analysis Summary. Credit was taken for the VRT thereby reducing the amount of flashed gas flowing through the tank vent lines.

Using the same calculation methodology, the total gas flow rate can be increased to approximately 370 Mscfd (1,184 lb/hr) and stay at or below the opening pressure of an Enardo ES-660 thief hatch (14.4 oz/in^2). This is approximately 2.3 times the normal operating flow.

Standard pressure drop "K" value for fittings and valves per Crane Technical Paper 410 were used. The value used for the absolute roughness of steel was 0.0005 ft.

**Attached are the tabulated results of the hydraulic calculations*

Disclaimer:

This assessment meets the certification requirements of 40 CFR part 60 subpart 0000a. It is the responsibility of *Marathon Oil* to comply with the reporting requirements of this regulation.

This evaluation does not consider the destructive efficiency of the controlled device or components upstream of the tank vent design.

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303-515-2700

Hunts Along Facility Tank Battery Vent Line Design & Capacity Assessment

TO:	Marathon Oil
FROM:	Tim Archuleta
CC:	Nate Mascarenas, Kendra Meeker
DATE:	July 19, 2017
RE:	Hunts Along Facility- Vent Line Design and Capacity Assessment

(b) (6) [redacted]

The US EPA finalized "Standards of Performance for Crude Oil and Natural Gas Facilities for which Construction, Modification or Reconstruction Commenced After September 18, 2015" on June 3, 2016. This regulation has requirements for certifying the design of closed vent systems. An assessment of the closed vent must be performed to determine it is of sufficient design and capacity to ensure that all emissions from storage vessels are routed to the control device or process and have it certified by a qualified professional engineer. This regulation is 40 CFR 40 Subpart OOOOa, referred to as the Quad Oa regulation.

Certification for 40 CFR 60.5411a(d):

"I certify that the closed vent system design and capacity assessment was prepared under my direction or supervision. I further certify that the closed vent system design and capacity assessment was conducted and this report was prepared pursuant to the requirements of subpart Quad Oa of 40 CFR part 60. Based on my professional knowledge and experience, and inquiry of personnel involved in the assessment, the certification submitted herein is true, accurate, and complete. I am aware that there are penalties for knowingly submitting false information."

Purpose:

Evaluate the new Hunts Along Facility tank battery vent line design to ensure that the Enardo ES-660 thief hatches, which are set at 16 oz/in^2, will not open during normal operating scenarios. The normal flow path for the vapor from the storage tanks will be to two flares where the off gas will be combusted to meet Quad Oa regulations.

This tank battery is comprised of three different production trains; Hunts Along, Shoots and Demaray with separate tank vent headers and flare knock out drums which then combine into a single flare header that flows to two flares.

Results:

Based on the 3D piping model (dated 7/19/17) of the vent systems and predicted vapor flow rates, Halker Consulting evaluated the pipe routing from the storage tanks to the flare and calculated the expected pressure drop in the systems during the Marathon Oil specified maximum predicted vapor flow rates. The pressure at the outlet of the flare was set at local atmospheric pressure of approximately 13.5 psia. Pressure drop through the piping systems from the furthest storage tank to the flare was calculated for each of the three production trains. The maximum pressures of the tanks occur on different days of production and are:

Hunts Along: 5.1 oz/in^{2}g

Shoots: 8.7 oz/in^{2}g

Demaray: 7.7 oz/in^{2}g

Calculations:

A flare tip pressure drop of 0.0 oz/in^2 was used and was based on information provided by Steffes Flare systems for the Air Assist Model 4. The flame arrestor pressure drops used is based on the Enardo sizing program for a 6" Series 8 inline flame arrestor.

Because this tank vent system is composed of three individual trains each having their own peak rate, each train's peak rate, which occur on different days due to well staggering, were evaluated to determine the maximum pressure at the tanks for each train. It was determined that the maximum pressure for each train is attained at the peak flow rate for each train. The gas composition used was the average composition from the February 2017 Clarks Creek (MM) Analysis Summary. Credit was taken for the VRT on Hunts Along thereby reducing the amount of flashed gas that was calculated using the provided flash gas factor. Shoots and Demaray do not have VRTs installed therefore no reduction in tank vapor rate was applied.

	Day 1: Shoots Peak Rate		Day 8: Demaray Peak Rate / System Peak Rate		Day 22: Hunts Along Peak Rate	
	CTB Flowrate [Mscfd]	CTB Tank Pressure [osig]	CTB Flowrate [Mscfd]	CTB Tank Pressure [osig]	CTB Flowrate [Mscfd]	CTB Tank Pressure [osig]
Hunts Along CTB	90	2.1	159	4.9	208	5.1
Shoots CTB	551	8.7	422	7.4	288	3.8
Demaray CTB	0	1.3	394	7.7	226	3.3
Total System	641	-	975	-	722	-

Using the same calculation methodology, the total gas flow rate can be increased to approximately 1,303 Mscfd and stay below the opening pressure of an Enardo ES-660 thief hatch (14.4 oz/in^2). This is approximately 1.3 times the normal operating flow. The flow was increased by an equal factor of 13% applied to the maximum forecast tank vapor rates for each of the three trains.

Standard pressure drop "K" value for fittings and valves per Crane Technical Paper 410 were used. The value used for the absolute roughness of steel was 0.00015 ft.

**Attached are the tabulated results of the hydraulic calculations*

Disclaimer:

This assessment meets the certification requirements of 40 CFR part 60 subpart 0000a. It is the responsibility of *Marathon Oil* to comply with the reporting requirements of this regulation.

This evaluation does not consider the destructive efficiency of the controlled device or components upstream of the tank vent design.

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IRON WOMAN TANK BATTERY VENT LINE DESIGN AND CAPACITY ASSESSMENT

TO:	Marathon Oil
FROM:	Tim Archuleta
CC:	Kendra Meeker, Nate Mascarenas
DATE:	July 11, 2017
RE:	Iron Woman Facility- Vent Line Design and Capacity Assessment

(b) (6) [redacted]

The US EPA finalized "Standards of Performance for Crude Oil and Natural Gas Facilities for which Construction, Modification or Reconstruction Commenced After September 18, 2015" on June 3, 2016. This regulation has requirements for certifying the design of closed vent systems. An assessment of the closed vent must be performed to determine it is of sufficient design and capacity to ensure that all emissions from storage vessels are routed to the control device or process and have it certified by a qualified professional engineer. This regulation is 40 CFR 40 Subpart OOOOa, referred to as the Quad Oa regulation.

Certification for 40 CFR 60.5411a(d):

"I certify that the closed vent system design and capacity assessment was prepared under my direction or supervision. I further certify that the closed vent system design and capacity assessment was conducted and this report was prepared pursuant to the requirements of subpart Quad Oa of 40 CFR part 60. Based on my professional knowledge and experience, and inquiry of personnel involved in the assessment, the certification submitted herein is true, accurate, and complete. I am aware that there are penalties for knowingly submitting false information."

Purpose:

Evaluate the new Iron Woman facility tank battery vent line design to ensure that the thief hatches, which are set at 16 oz/in^2, will not open during normal operating flow rate scenarios. The normal flow path for the vapor from the storage tanks will be to one flare where the off gas will be combusted to meet Quad Oa regulations.

Results:

Based on the 3D model of the vent system and predicted vapor flow rates using a Marathon Oil flash gas factor of 150 scf/bbl GOR, Halker Consulting evaluated the pipe routing from the storage tanks to the flare and calculated the expected pressure drop in the system. The pressure at the outlet of the flare was set at local atmospheric pressure of approximately 13.5 psia. Pressure drop through the piping system from the furthest storage tank to the flare was calculated and found to have a backpressure on the tank battery of 1.2 psig (19 oz/in^{2}g) at 486 mscfd. This pressure exceeds the maximum allowable pressure on the tank of 16 oz/in^{2}g and will cause the thief hatch to open. To stay below the thief hatch cracking pressure of 14.4 oz/in^{2}g the flow rate cannot exceed approximately 417 mscfd. To operate below the max flow rate, it is suggested that the heater treater be operated below 60 psig in the short term until the peak production rates drop below the maximum allowable throughput of the tank vent system. Peak production should decrease within 1-2 weeks of initial production and at that time the heater treater pressure can be increased to the normal 80 psig operating pressure.

Calculations:

A flare tip pressure drop of 0.00 psi (0.0 oz/in^2) was used and was based on information provided by Steffes Flare systems for the Air Assist Model 4. The flame arrestor pressure drop used is based on the Enardo sizing program for a 4" Series 8 inline flame arrestor.

The total gas flow rate to the flare used was 486 mscfd , and is based on a condensate flash factor of 150 scf/bbl and gas composition provided by Marathon Oil. The gas composition used was the average composition from the February 2017 Clarks Creek (MM) Analysis Summary.

The suggested heater treater operating pressure of 60 psig was determined by using a process simulator to determine the percentage decrease in the flash gas factor at the tanks by incrementally decreasing the heater treater operating pressure from 80 psig to 20 psig.

Standard pressure drop "K" value for fittings and valves per Crane Technical Paper 410 were used. The value used for the absolute roughness of steel was 0.00015 ft.

**Attached are the tabulated results of the hydraulic calculations*

Disclaimer:

This assessment meets the certification requirements of 40 CFR part 60 subpart 0000a. It is the responsibility of *Marathon Oil* to comply with the reporting requirements of this regulation.

This evaluation does not consider the destructive efficiency of the controlled device or components upstream of the tank vent design.

Kattevold USA CTB Vent Line Design & Capacity Assessment

TO:	Marathon Oil	[redacted]
FROM:	Tim Archuleta	
CC:	Nate Mascarenas, Kendra Meeker	
DATE:	July 17, 2017	
RE:	Kattevold USA CTB- Vent Line Design and Capacity Assessment	

The US EPA finalized "Standards of Performance for Crude Oil and Natural Gas Facilities for which Construction, Modification or Reconstruction Commenced After September 18, 2015" on June 3, 2016. This regulation has requirements for certifying the design of closed vent systems. An assessment of the closed vent must be performed to determine it is of sufficient design and capacity to ensure that all emissions from storage vessels are routed to the control device or process and have it certified by a qualified professional engineer. This regulation is 40 CFR 40 Subpart OOOOa, referred to as the Quad Oa regulation.

Certification for 40 CFR 60.5411a(d):

"I certify that the closed vent system design and capacity assessment was prepared under my direction or supervision. I further certify that the closed vent system design and capacity assessment was conducted and this report was prepared pursuant to the requirements of subpart Quad Oa of 40 CFR part 60. Based on my professional knowledge and experience, and inquiry of personnel involved in the assessment, the certification submitted herein is true, accurate, and complete. I am aware that there are penalties for knowingly submitting false information."

Purpose:

Evaluate the new Kattevold USA CTB tank battery vent line design to ensure that the Enardo ES-660 thief hatches, which are set at 16 oz/in^2, will not open during normal operating flow rate scenarios. The normal flow path for the vapor from the storage tanks will be to two flares where the off gas will be combusted to meet Quad Oa regulations.

This tank battery is comprised of two different production trains: the Kattevold USA CTB and Alexander USA single well facility with separate tank vent headers and flare knock out drums which then combine into a single flare header that flows to two flares.

Results:

Based on the 3D model (dated 7/6/17) of the vent systems and predicted vapor flow rates, Halker Consulting evaluated the pipe routing from the storage tanks to the flare and calculated the expected pressure drop in the system during the Marathon Oil specified maximum predicted vapor flow rates. The pressure at the outlet of the flare was set at local atmospheric pressure of approximately 13.5 psia. Pressure drop through the piping system from the furthest storage tank to the flare was calculated for each of the well pads with the following results:

Kattevold USA CTB:	6.3 oz/in^{2}g
Alexander USA single well facility:	3.7 oz/in^{2}g

Calculations:

A flare tip pressure drop of 0.0 oz/in^2 was used and was based on information provided by Steffes Flare systems for the Air Assist Model 4. The flame arrestor pressure drop used was 0.64 oz/in^2 and is based on the Enardo sizing program for a 6" Series 8 inline flame arrestor.

Because this tank vent system is composed of two individual production trains each having their own peak rate, two total system peak rates were evaluated corresponding to the peak rates from each individual production train. It was determined that the worst case scenario exists when the total gas flow rate was 1,022 Mscfd (3,271 lb/hr) which corresponds to the Kattevold production train peak rate. The tank gas flow rate is. based on a condensate flash factor and gas composition provided by Marathon Oil. The gas composition used was the average composition from the February 2017 Clarks Creek (MM) Analysis Summary.

Using the same calculation methodology, the total gas flow rate can be increased to approximately 1,584 Mscfd and stay below the opening pressure of an Enardo ES-660 thief hatch (14.4 oz/in^2). This is approximately 1.55 times the normal flow. The flow was increased by an equal factor of 55% applied to the maximum forecast tank vapor rates for each of the two trains.

Standard pressure drop "K" value for fittings and valves per Crane Technical Paper 410 were used. The value used for the absolute roughness of steel was 0.00015 ft.

**Attached are the tabulated results of the hydraulic calculations*

Disclaimer:

This assessment meets the certification requirements of 40 CFR part 60 subpart 0000a. It is the responsibility of *Marathon Oil* to comply with the reporting requirements of this regulation.

This evaluation does not consider the destructive efficiency of the controlled device or components upstream of the tank vent design.

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303-515-2700

KERMIT FACILITY TANK BATTERY VENT LINE DESIGN AND CAPACITY ASSESSMENT

TO:	Marathon Oil
FROM:	Tim Archuleta
CC:	Kendra Meeker, Nate Mascarenas
DATE:	July 11, 2017
RE:	Kermit Facility- Vent Line Design and Capacity Assessment

(b) (6) [redacted]

The US EPA finalized "Standards of Performance for Crude Oil and Natural Gas Facilities for which Construction, Modification or Reconstruction Commenced After September 18, 2015" on June 3, 2016. This regulation has requirements for certifying the design of closed vent systems. An assessment of the closed vent must be performed to determine it is of sufficient design and capacity to ensure that all emissions from storage vessels are routed to the control device or process and have it certified by a qualified professional engineer. This regulation is 40 CFR 40 Subpart OOOOa, referred to as the Quad Oa regulation.

Certification for 40 CFR 60.5411a(d):

"I certify that the closed vent system design and capacity assessment was prepared under my direction or supervision. I further certify that the closed vent system design and capacity assessment was conducted and this report was prepared pursuant to the requirements of subpart Quad Oa of 40 CFR part 60. Based on my professional knowledge and experience, and inquiry of personnel involved in the assessment, the certification submitted herein is true, accurate, and complete. I am aware that there are penalties for knowingly submitting false information."

Purpose:

Evaluate the new Kermit facility tank battery vent line design to ensure that the thief hatches, which are set at 16 oz/in^2 will not open during normal operating flow rate scenarios. The normal flow path for the vapor from the storage tanks will be to one flare where the off gas will be combusted to meet Quad Oa regulations.

Results:

Based on the 3D model of the vent system and predicted vapor flow rates, Halker Consulting evaluated the pipe routing from the storage tanks to the flare and calculated the expected pressure drop in the system during the Marathon Oil specified maximum predicted vapor flow rates. The pressure at the outlet of the flare was set at local atmospheric pressure of approximately 13.5 psia. Pressure drop through the piping system from the furthest storage tank to the flare was calculated and found to have a backpressure on the tank battery of 0.24 psig (3.9 oz/in^2).

During normal operating conditions the 3.9 oz/in^{2}g pressure should be the highest pressure that the tanks will see and is 24% of the of 16 oz/in^{2}g set pressure of the thief hatch.

Observation:

To minimize the backpressure on the tanks and therefore minimize the possibility of venting uncombusted vapors, Halker recommends not installing inline components that add additional pressure drop through the tank vapor system including, but not limited to: swing check valves, pressure control devices, and unnecessary ball, gate, or globe valves. Additionally, routing the tank vapor system in a manner that does not allow liquids to build up inside the pipeline allows for minimizing pressure drop through the system by being able to utilize the entire cross sectional area of the piping configuration as well as minimizing the possibility of sending liquids to the flare.

Calculations:

A flare tip pressure drop of 0.0 oz/in^2 was used and was based on information provided by Steffes Flare systems for the Air Assist Model 4. The flame arrestor pressure drop used was 0.75 oz/in^2 and is based on the Enardo sizing program for a 4" Series 8 inline flame arrestor.

The total gas flow rate to the flare used was 218 Mscfd (698 lb/hr), and is based on a condensate flash factor and gas composition provided by Marathon Oil. The gas composition used was the average composition from the February 2017 Clarks Creek (MM) Analysis Summary. Credit was taken for the VRT thereby reducing the amount of flashed gas that was calculated using the provided flash gas factor.

Using the same calculation methodology, the total gas flow rate can be increased to 445 Mscfd (1425 lb/hr) and stay below the opening pressure of an Enardo ES-660 thief hatch (14.4 oz/in^2). This is approximately 2 times the normal operating flow.

Standard pressure drop "K" value for fittings and valves per Crane Technical Paper 410 were used. The value used for the absolute roughness of steel was 0.00015 ft.

**Attached are the tabulated results of the hydraulic calculations and the vent isometric drawing.*

Disclaimer:

This assessment meets the certification requirements of 40 CFR part 60 subpart 0000a. It is the responsibility of *Marathon Oil* to comply with the reporting requirements of this regulation.

This evaluation does not take into account the destructive efficiency of the controlled device or components upstream of the tank vent design.

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LENA FACILITY TANK BATTERY VENT LINE DESIGN AND CAPACITY ASSESSMENT

TO:	Marathon Oil	(b) (6) [redacted]
FROM:	Tim Archuleta	
CC:	Nate Mascarenas, Kendra Meeker	
DATE:	July 19, 2017	
RE:	Lena Facility- Vent Line Design and Capacity Assessment	

The US EPA finalized "Standards of Performance for Crude Oil and Natural Gas Facilities for which Construction, Modification or Reconstruction Commenced After September 18, 2015" on June 3, 2016. This regulation has requirements for certifying the design of closed vent systems. An assessment of the closed vent must be performed to determine it is of sufficient design and capacity to ensure that all emissions from storage vessels are routed to the control device or process and have it certified by a qualified professional engineer. This regulation is 40 CFR 40 Subpart OOOOa, referred to as the Quad Oa regulation.

Certification for 40 CFR 60.5411a(d):

"I certify that the closed vent system design and capacity assessment was prepared under my direction or supervision. I further certify that the closed vent system design and capacity assessment was conducted and this report was prepared pursuant to the requirements of subpart Quad Oa of 40 CFR part 60. Based on my professional knowledge and experience, and inquiry of personnel involved in the assessment, the certification submitted herein is true, accurate, and complete. I am aware that there are penalties for knowingly submitting false information."

Purpose:

Evaluate the new Lena facility tank battery vent line design to ensure that the Enardo ES-660 thief hatches, which are set at 16 oz/in^2 will not open during normal operating flow rate scenarios. The normal flow path for the vapor from the storage tanks will be to one flare where the off gas will be combusted to meet Quad Oa regulations.

Results:

Based on the 3D piping model (dated 6/13/17) of the vent system and predicted vapor flow rates, Halker Consulting evaluated the pipe routing from the storage tanks to the flare and calculated the expected pressure drop in the system during the Marathon Oil specified maximum predicted vapor flow rates. The pressure at the outlet of the flare was set at local atmospheric pressure of approximately 13.46 psia. Pressure drop through the piping system from the furthest storage tank to the flare was calculated and found to have a backpressure on the tank battery of 0.49 psig (7.8 oz/in^{2}g).

During normal operating conditions the 7.8 oz/in^{2}g pressure should be the highest pressure that the tanks will see and is 49% of the of 16 oz/in^{2}g set pressure of the thief hatch.

Calculations:

A flare tip pressure drop of 0.0 oz/in² was used and was based on information provided by Steffes Flare systems for the Air Assist Model 4. The flame arrestor pressure drop used was 0.72 oz/in² and is based on the Enardo sizing program for a 6" Series 8 inline flame arrestor.

The total gas flow rate to the flare used was 551 Mscfd, and is based on a condensate flash factor and gas composition provided by Marathon Oil. The gas composition used was the average composition from the February 2017 Clarks Creek (MM) Analysis Summary.

Using the same calculation methodology, the total gas flow rate can be increased to 765 Mscfd and stay below the opening pressure of an Enardo ES-660 thief hatch (14.4 oz/in²). This is approximately 1.39 times the normal operating flow.

Standard pressure drop "K" value for fittings and valves per Crane Technical Paper 410 were used. The value used for the absolute roughness of steel was 0.00015 ft.

**Attached are the tabulated results of the hydraulic calculations*

Disclaimer:

This assessment meets the certification requirements of 40 CFR part 60 subpart 0000a. It is the responsibility of *Marathon Oil* to comply with the reporting requirements of this regulation.

This evaluation does not consider the destructive efficiency of the controlled device or components upstream of the tank vent design.

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MARLIN 14 CTB VENT LINE DESIGN AND CAPACITY ASSESSMENT

TO:	Marathon Oil
FROM:	Tim Archuleta
CC:	Craig Melton, Andrew Depperschmidt
DATE:	April 19, 2017
RE:	Marlin 14 CTB - Vent Line Design and Capacity Assessment

(b) (6) [redacted]

The US EPA finalized "Standards of Performance for Crude Oil and Natural Gas Facilities for which Construction, Modification or Reconstruction Commenced After September 18, 2015" on June 3, 2016. This regulation has requirements for certifying the design of closed vent systems. An assessment of the closed vent must be performed to determine it is of sufficient design and capacity to ensure that all emissions from storage vessels are routed to the control device or process and have it certified by a qualified professional engineer. This regulation is 40 CFR 40 Subpart OOOOa, referred to as the Quad Oa regulation.

Certification for 40 CFR 60.5411a(d):

"I certify that the closed vent system design and capacity assessment was prepared under my direction or supervision. I further certify that the closed vent system design and capacity assessment was conducted and this report was prepared pursuant to the requirements of subpart Quad Oa of 40 CFR part 60. Based on my professional knowledge and experience, and inquiry of personnel involved in the assessment, the certification submitted herein is true, accurate, and complete. I am aware that there are penalties for knowingly submitting false information."

Purpose:

Evaluate the new Marlin 14 central tank battery vent line design to ensure that the thief hatches, which are set at 16 oz/in^2 will not open during normal operating flow rate scenarios. The normal flow path for the vapor from the storage tanks will be to one flare where the off gas will be combusted to meet Quad Oa regulations.

Results:

Based on the Marathon Oil verified tank isometric drawing and predicted vapor flow rates, Halker Consulting evaluated the pipe routing from the storage tanks to the flare and calculated the expected pressure drop in the system during the Marathon Oil specified maximum predicted vapor flow rates. The pressure at the outlet of the flare was set at local atmospheric pressure of approximately 13.46 psia. Pressure drop through the piping system from the furthest storage tank to the flare was calculated and found to have a backpressure on the tank battery of 0.60 psig (9.6 oz/in^2).

During normal operating conditions the 9.6 oz/in^{2}g pressure should be the highest pressure that the tanks will see and is 60% of the of 16 oz/in^{2}g set pressure of the thief hatch.

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Observation:

In order to minimize the backpressure on the tanks and therefore minimize the possibility of venting uncombusted vapors, Halker recommends not installing inline components that add additional pressure drop through the tank vapor system including, but not limited to: swing check valves, pressure control devices, and unnecessary ball, gate, or globe valves. Additionally, routing the tank vapor system in a manner that does not allow liquids to build up inside the pipeline allows for minimizing pressure drop through the system by being able to utilize the entire cross sectional area of the piping configuration as well as minimizing the possibility of sending liquids to the flare.

Calculations:

A flare tip pressure drop of 1.4 oz/in^2 was used and was based on information provided by Marathon Oil for a Sterffes air assist LP Flare. The flame arrestor pressure drop used was 1.0 oz/in^2 and is based on the information provided by Marathon for an Enardo 6" Series 8 inline flame arrestor.

The total gas flow rate to the flare used was 727 mscfd (2,326 lb/hr), and Is based on information provided by Marathon Oil. The gas composition used was the average composition from the February 2017 Clarks Creek (MM) Analysis Summary.

Standard pressure drop "K" value for fittings and valves per Crane Technical Paper 410 were used. The value used for the absolute roughness of steel was 0.00015 ft.

**Attached are the tabulated results of the hydraulic calculations and the vent isometric drawing.*

Disclaimer:

This assessment meets the certification requirements of 40 CFR part 60 subpart 0000a. It is the responsibility of *Marathon Oil* to comply with the reporting requirements of this regulation.

This evaluation does not take into account the destructive efficiency of the controlled device or components upstream of the tank vent design.

SHERMAN USA CTB VENT LINE DESIGN AND CAPACITY ASSESSMENT

TO:	Marathon Oil
FROM:	Tim Archuleta
CC:	Nate Mascarenas, Kendra Meeker
DATE:	July 12, 2017
RE:	Sherman USA CTB - Vent Line Design and Capacity Assessment

(b) (6) [redacted]

The US EPA finalized "Standards of Performance for Crude Oil and Natural Gas Facilities for which Construction, Modification or Reconstruction Commenced After September 18, 2015" on June 3, 2016. This regulation has requirements for certifying the design of closed vent systems. An assessment of the closed vent must be performed to determine it is of sufficient design and capacity to ensure that all emissions from storage vessels are routed to the control device or process and have it certified by a qualified professional engineer. This regulation is 40 CFR 40 Subpart OOOOa, referred to as the Quad Oa regulation.

Certification for 40 CFR 60.5411a(d):

"I certify that the closed vent system design and capacity assessment was prepared under my direction or supervision. I further certify that the closed vent system design and capacity assessment was conducted and this report was prepared pursuant to the requirements of subpart Quad Oa of 40 CFR part 60. Based on my professional knowledge and experience, and inquiry of personnel involved in the assessment, the certification submitted herein is true, accurate, and complete. I am aware that there are penalties for knowingly submitting false information."

Purpose:

Evaluate the new Sherman USA CTB vent line design to ensure that the Enardo ES-660 thief hatches, which are set at 16 oz/in^2, will not open during normal operating flow rate scenarios. The normal flow path for the vapor from the storage tanks will be to one flare where the off gas will be combusted to meet Quad Oa regulations.

Results:

Based on the vent system 3D model (dated 7-10-2017) and predicted vapor flow rates, Halker Consulting evaluated the pipe routing from the storage tanks to the flare and calculated the expected pressure drop in the system during the Marathon Oil specified maximum predicted vapor flow rates. The pressure at the outlet of the flare was set at local atmospheric pressure of 13.5 psia. Pressure drop through the piping system from the furthest storage tank to the flare was calculated and found to have a backpressure on the tank battery of 0.52 psig (8.3 oz/in^{2}g).

During normal operating conditions the 8.3 oz/in^{2}g pressure should be the highest pressure that the tanks will see and is 52% of the of 16 oz/in^{2}g set pressure of the thief hatch.

Calculations:

A flare tip pressure drop of 0.0 oz/in² was used and was based on information provided by Steffes Flare systems for the Air Assist Model 4. The flame arrestor pressure drop used was 0.34 oz/in² and is based on the Enardo sizing program for a 6" Series 8 inline flame arrestor.

The total gas flow rate to the flare used was 345 Mscfd (1,103 lb/hr), and is based on a condensate flash factor and gas composition provided by Marathon Oil. The gas composition used was the average composition from the February 2017 Clarks Creek (MM) Analysis Summary. Credit was taken for the VRT thereby reducing the amount of flashed gas that was calculated using the provided flash gas factor.

Using the same calculation methodology, the total gas flow rate can be increased to approximately 462 Mscfd (1,480 lb/hr) and stay at or below the opening pressure of an Enardo ES-660 thief hatch (14.4 oz/in²). This is approximately 1.3 times the normal operating flow.

Standard pressure drop "K" value for fittings and valves per Crane Technical Paper 410 were used. The value used for the absolute roughness of steel was 0.00015 ft.

**Attached are the tabulated results of the hydraulic calculations*

Disclaimer:

This assessment meets the certification requirements of 40 CFR part 60 subpart 0000a. It is the responsibility of *Marathon Oil* to comply with the reporting requirements of this regulation.

This evaluation does not consider the destructive efficiency of the controlled device or components upstream of the tank vent design.

HALKER
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7936 E. Arapahoe Ct., Suite 3200
Centennial, CO 80112
303-515-2700

BETHOL TANK BATTERY VENT LINE DESIGN AND CAPACITY ASSESSMENT

TO: Marathon Oil

FROM: Tim Archuleta

CC: Nate Mascarenas, Kendra Meeker

DATE: June 22, 2017

RE: Bethol Facility- Vent Line Design and Capacity Assessment

(b) (6) [redacted]

The US EPA finalized "Standards of Performance for Crude Oil and Natural Gas Facilities for which Construction, Modification or Reconstruction Commenced After September 18, 2015" on June 3, 2016. This regulation has requirements for certifying the design of closed vent systems. An assessment of the closed vent must be performed to determine it is of sufficient design and capacity to ensure that all emissions from storage vessels are routed to the control device or process and have it certified by a qualified professional engineer. This regulation is 40 CFR 40 Subpart OOOOa, referred to as the Quad Oa regulation.

Certification for 40 CFR 60.5411a(d):

"I certify that the closed vent system design and capacity assessment was prepared under my direction or supervision. I further certify that the closed vent system design and capacity assessment was conducted and this report was prepared pursuant to the requirements of subpart Quad Oa of 40 CFR part 60. Based on my professional knowledge and experience, and inquiry of personnel involved in the assessment, the certification submitted herein is true, accurate, and complete. I am aware that there are penalties for knowingly submitting false information."

Purpose:

Evaluate the new Bethol facility tank battery vent line design to ensure that the Enardo ES-660 thief hatches, which are set at 16 oz/in^2 will not open during normal operating flow rate scenarios. The normal flow path for the vapor from the storage tanks will be to one flare where the off gas will be combusted to meet Quad Oa regulations.

Results:

Based on the 3D model of the vent system and predicted vapor flow rates, Halker Consulting evaluated the pipe routing from the storage tanks to the flare and calculated the expected pressure drop in the system during the Marathon Oil specified maximum predicted vapor flow rates. The pressure at the outlet of the flare was set at local atmospheric pressure of 13.5 psia. Pressure drop through the piping system from the furthest storage tank to the flare was calculated and found to have a backpressure on the tank battery of 0.19 psig (3.1 oz/in^2g).

During normal operating conditions the 3.1 oz/in^2g pressure should be the highest pressure that the tanks will see and is 19% of the of 16 oz/in^2g set pressure of the thief hatch.

Calculations:

A flare tip pressure drop of 0.0 oz/in^2 was used and was based on information provided by Steffes Flare systems for the Air Assist Model 4. The flame arrestor pressure drop used was 0.3 oz/in^2 and is based on the Enardo sizing program for a 6" Series 8 inline flame arrestor.

The total gas flow rate to the flare used was 335 mscfd (1,072 lb/hr), and is based on a condensate flash factor and gas composition provided by Marathon Oil. The gas composition used was the average composition from the February 2017 Clarks Creek (MM) Analysis Summary. Credit was taken for the VRT thereby reducing the amount of flashed gas that was calculated using the provided flash gas factor.

Using the same calculation methodology, the total gas flow rate can be increased to approximately 765 mscfd (2,450 lb/hr) and stay at or below the opening pressure of an Enardo ES-660 thief hatch (14.4 oz/in^2). This is approximately 2.3 times the normal operating flow.

Standard pressure drop "K" value for fittings and valves per Crane Technical Paper 410 were used. The value used for the absolute roughness of steel was 0.00015 ft.

**Attached are the tabulated results of the hydraulic calculations*

Disclaimer:

This assessment meets the certification requirements of 40 CFR part 60 subpart 0000a. It is the responsibility of *Marathon Oil* to comply with the reporting requirements of this regulation.

This evaluation does not consider the destructive efficiency of the controlled device or components upstream of the tank vent design.

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Centennial, CO 80112
303-515-2700

Chapman Facility Tank Battery Vent Line Design & Capacity Assessment

TO:	Marathon Oil	(b) (6) [redacted]
FROM:	Tim Archuleta	
CC:	Nate Mascarenas, Kendra Meeker	
DATE:	June 22, 2017	
RE:	Chapman Facility- Vent Line Design and Capacity Assessment	

The US EPA finalized "Standards of Performance for Crude Oil and Natural Gas Facilities for which Construction, Modification or Reconstruction Commenced After September 18, 2015" on June 3, 2016. This regulation has requirements for certifying the design of closed vent systems. An assessment of the closed vent must be performed to determine it is of sufficient design and capacity to ensure that all emissions from storage vessels are routed to the control device or process and have it certified by a qualified professional engineer. This regulation is 40 CFR 40 Subpart OOOOa, referred to as the Quad Oa regulation.

Certification for 40 CFR 60.5411a(d):

"I certify that the closed vent system design and capacity assessment was prepared under my direction or supervision. I further certify that the closed vent system design and capacity assessment was conducted and this report was prepared pursuant to the requirements of subpart Quad Oa of 40 CFR part 60. Based on my professional knowledge and experience, and inquiry of personnel involved in the assessment, the certification submitted herein is true, accurate, and complete. I am aware that there are penalties for knowingly submitting false information."

Purpose:

Evaluate the new Chapman facility tank battery vent line design to ensure that the Enardo ES-660 thief hatches, which are set at 16 oz/in^2 will not open during normal operating flow rate scenarios. The normal flow path for the vapor from the storage tanks will be to one flare where the off gas will be combusted to meet Quad Oa regulations.

Results:

Based on the 3D model of the vent system and predicted vapor flow rates, Halker Consulting evaluated the pipe routing from the storage tanks to the flare and calculated the expected pressure drop in the system during the Marathon Oil specified maximum predicted vapor flow rates. The pressure at the outlet of the flare was set at local atmospheric pressure of 13.5 psia. Pressure drop through the piping system from the furthest storage tank to the flare was calculated and found to have a backpressure on the tank battery of 0.57 psig (9.2 oz/in^{2}g).

During normal operating conditions the 9.2 oz/in^{2}g pressure should be the highest pressure that the tanks will see and is 57% of the of 16 oz/in^{2}g set pressure of the thief hatch.

Calculations:

A flare tip pressure drop of 0.0 oz/in^2 was used and was based on information provided by Steffes Flare systems for the Air Assist Model 4. The flame arrestor pressure drop used was 1.3 oz/in^2 and is based on the Enardo sizing program for a 6" Series 8 inline flame arrestor.

The total gas flow rate to the flare used was 789 mscfd (2,525 lb/hr), and is based on a condensate flash factor and gas composition provided by Marathon Oil. The gas composition used was the average composition from the February 2017 Clarks Creek (MM) Analysis Summary.

Using the same calculation methodology, the total gas flow rate can be increased to approximately 1.1 mmscfd (3,680 lb/hr) and stay at or below the opening pressure of an Enardo ES-660 thief hatch (14.4 oz/in^2). This is approximately 1.5 times the normal operating flow.

Standard pressure drop "K" value for fittings and valves per Crane Technical Paper 410 were used. The value used for the absolute roughness of steel was 0.00015 ft.

**Attached are the tabulated results of the hydraulic calculations*

Disclaimer:

This assessment meets the certification requirements of 40 CFR part 60 subpart 0000a. It is the responsibility of *Marathon Oil* to comply with the reporting requirements of this regulation.

This evaluation does not consider the destructive efficiency of the controlled device or components upstream of the tank vent design.

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STARK FACILITY TANK BATTERY VENT LINE DESIGN AND CAPACITY ASSESSMENT

TO:	Marathon Oil
FROM:	Tim Archuleta
CC:	Kendra Meeker, Nate Mascarenas
DATE:	September 12, 2017
RE:	Stark Facility- Vent Line Design and Capacity Assessment

(b) (6) [redacted]

The US EPA finalized "Standards of Performance for Crude Oil and Natural Gas Facilities for which Construction, Modification or Reconstruction Commenced After September 18, 2015" on June 3, 2016. This regulation has requirements for certifying the design of closed vent systems. An assessment of the closed vent must be performed to determine it is of sufficient design and capacity to ensure that all emissions from storage vessels are routed to the control device or process and have it certified by a qualified professional engineer. This regulation is 40 CFR 40 Subpart OOOOa, referred to as the Quad Oa regulation.

Certification for 40 CFR 60.5411a(d):

"I certify that the closed vent system design and capacity assessment was prepared under my direction or supervision. I further certify that the closed vent system design and capacity assessment was conducted and this report was prepared pursuant to the requirements of subpart Quad Oa of 40 CFR part 60. Based on my professional knowledge and experience, and inquiry of personnel involved in the assessment, the certification submitted herein is true, accurate, and complete. I am aware that there are penalties for knowingly submitting false information."

Purpose:

Evaluate the new Stark facility tank battery vent line design to ensure that the thief hatches, which are set at 16 oz/in^2 will not open during normal operating flow rate scenarios. The normal flow path for the vapor from the storage tanks will be to one flare where the off gas will be combusted to meet Quad Oa regulations.

Results:

Based on the 3D model (dated 7.20.2017) of the vent system and predicted vapor flow rates, Halker Consulting evaluated the pipe routing from the storage tanks to the flare and calculated the expected pressure drop in the system during the Marathon Oil specified maximum predicted vapor flow rates. The pressure at the outlet of the flare was set at local atmospheric pressure of approximately 13.46 psia. Pressure drop through the piping system from the furthest storage tank to the flare was calculated and found to have a backpressure on the tank battery of 0.4 psig (6.5 oz/in^{2}g).

During normal operating conditions the 6.5 oz/in^{2}g pressure should be the highest pressure that the tanks will see and is 40% of the of 16 oz/in^{2}g set pressure of the thief hatch.

Calculations:

A flare tip pressure drop of 0.0 oz/in^2 was used and was based on information provided by Steffes Flare systems for the Air Assist Model 4. The flame arrestor pressure drop used was 0.8 oz/in^2 and is based on the Enardo sizing program for a 4" Series 8 inline flame arrestor.

The total gas flow rate to the flare used was 265 Mscfd (848 lb/hr), and is based on a condensate flash factor and gas composition provided by Marathon Oil. The gas composition used was the average composition from the February 2017 Clarks Creek (MM) Analysis Summary. Credit was taken for the VRT thereby reducing the amount of flashed gas that was calculated using the provided flash gas factor.

Using the same calculation methodology, the total gas flow rate can be increased to approximately 405 Mscfd (1,296 lb/hr) and stay at or below the opening pressure of an Eñardo ES-660 thief hatch (14.4 oz/in^2). This is approximately 1.5 times the normal operating flow.

Standard pressure drop "K" value for fittings and valves per Crane Technical Paper 410 were used. The value used for the absolute roughness of steel was 0.00015 ft.

**Attached are the tabulated results of the hydraulic calculations*

Disclaimer:

This assessment meets the certification requirements of 40 CFR part 60 subpart 0000a. It is the responsibility of *Marathon Oil* to comply with the reporting requirements of this regulation.

This evaluation does not consider the destructive efficiency of the controlled device or components upstream of the tank vent design.

STOHLER 41 CTB VENT LINE DESIGN AND CAPACITY ASSESSMENT

TO:	Marathon Oil	(b) (6) [redacted]
FROM:	Tim Archuleta	
CC:	Nate Mascarenas, Kendra Meeker	
DATE:	August 30, 2017	
RE:	Stohler 41 CTB - Vent Line Design and Capacity Assessment	

The US EPA finalized "Standards of Performance for Crude Oil and Natural Gas Facilities for which Construction, Modification or Reconstruction Commenced After September 18, 2015" on June 3, 2016. This regulation has requirements for certifying the design of closed vent systems. An assessment of the closed vent must be performed to determine it is of sufficient design and capacity to ensure that all emissions from storage vessels are routed to the control device or process and have it certified by a qualified professional engineer. This regulation is 40 CFR 40 Subpart OOOOa, referred to as the Quad Oa regulation.

Certification for 40 CFR 60.5411a(d):

"I certify that the closed vent system design and capacity assessment was prepared under my direction or supervision. I further certify that the closed vent system design and capacity assessment was conducted and this report was prepared pursuant to the requirements of subpart Quad Oa of 40 CFR part 60. Based on my professional knowledge and experience, and inquiry of personnel involved in the assessment, the certification submitted herein is true, accurate, and complete. I am aware that there are penalties for knowingly submitting false information."

Purpose:

Evaluate the new Stohler 41 CTB vent line design to ensure that the Enardo ES-660 thief hatches, which are set at 16 oz/in^2, will not open during normal operating flow rate scenarios. The normal flow path for the vapor from the storage tanks will be to one flare where the off gas will be combusted to meet Quad Oa regulations.

Results:

Based on the vent system 3D model (dated 8/16/2017) and predicted vapor flow rates, Halker Consulting evaluated the pipe routing from the storage tanks to the flare and calculated the expected pressure drop in the system during the Marathon Oil specified maximum predicted vapor flow rates. The pressure at the outlet of the flare was set at local atmospheric pressure of 13.5 psia. Pressure drop through the piping system from the furthest storage tank to the flare was calculated and found to have a backpressure on the tank battery of 0.67 psig (10.8 oz/in^{2}g).

During normal operating conditions the 10.8 oz/in^{2}g pressure should be the highest pressure that the tanks will see and is 67% of the of 16 oz/in^{2}g set pressure of the thief hatch.

Calculations:

A flare tip pressure drop of 0.0 oz/in^2 was used and was based on information provided by Steffes Flare systems for the Air Assist Model 4. The flame arrestor pressure drop used was 1.79 oz/in^2 and is based on the Enardo sizing program for a 6" Series 8 inline flame arrestor.

The total gas flow rate to the flare used was 971 Mscfd, and is based on a condensate flash factor and gas composition provided by Marathon Oil. The gas composition used was the average composition from the February 2017 Clarks Creek (MM) Analysis Summary.

Using the same calculation methodology, the total gas flow rate can be increased to approximately 1140 Mscfd and stay at or below the opening pressure of an Enardo ES-660 thief hatch (14.4 oz/in^2). This is approximately 1.17 times the normal operating flow.

Standard pressure drop "K" value for fittings and valves per Crane Technical Paper 410 were used. The value used for the absolute roughness of steel was 0.00015 ft.

**Attached are the tabulated results of the hydraulic calculations*

Disclaimer:

This assessment meets the certification requirements of 40 CFR part 60 subpart 0000a. It is the responsibility of *Marathon Oil* to comply with the reporting requirements of this regulation.

This evaluation does not consider the destructive efficiency of the controlled device or components upstream of the tank vent design.

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TAT 34 FACILITY TANK BATTERY VENT LINE DESIGN AND CAPACITY ASSESSMENT

TO:	Marathon Oil
FROM:	John Van Pelt
CC:	Tim Archuleta, Nate Mascarenas, Kendra Meeker
DATE:	June 12, 2017
RE:	TAT 34 Facility- Vent Line Design and Capacity Assessment

(b) (6) [redacted]

The US EPA finalized "Standards of Performance for Crude Oil and Natural Gas Facilities for which Construction, Modification or Reconstruction Commenced After September 18, 2015" on June 3, 2016. This regulation has requirements for certifying the design of closed vent systems. An assessment of the closed vent must be performed to determine it is of sufficient design and capacity to ensure that all emissions from storage vessels are routed to the control device or process and have it certified by a qualified professional engineer. This regulation is 40 CFR 40 Subpart OOOOa, referred to as the Quad Oa regulation.

Certification for 40 CFR 60.5411a(d):

"I certify that the closed vent system design and capacity assessment was prepared under my direction or supervision. I further certify that the closed vent system design and capacity assessment was conducted and this report was prepared pursuant to the requirements of subpart Quad Oa of 40 CFR part 60. Based on my professional knowledge and experience, and inquiry of personnel involved in the assessment, the certification submitted herein is true, accurate, and complete. I am aware that there are penalties for knowingly submitting false information."

Purpose:

Evaluate the new TAT 34 facility tank battery vent line design to ensure that the Enardo ES-660 thief hatches, which are set at 16 oz/in^2 will not open during normal operating flow rate scenarios. The normal flow path for the vapor from the storage tanks will be to one flare where the off gas will be combusted to meet Quad Oa regulations.

Results:

Based on the 3D model of the vent system and predicted vapor flow rates, Halker Consulting evaluated the pipe routing from the storage tanks to the flare and calculated the expected pressure drop in the system during the Marathon Oil specified maximum predicted vapor flow rates. The pressure at the outlet of the flare was set at local atmospheric pressure of approximately 13.46 psia. Pressure drop through the piping system from the furthest storage tank to the flare was calculated and found to have a backpressure on the tank battery of 0.47 psig (7.5 oz/in^{2}g).

During normal operating conditions the 7.5 oz/in^{2}g pressure should be the highest pressure that the tanks will see and is 47% of the of 16 oz/in^{2}g set pressure of the thief hatch.

Calculations:

A flare tip pressure drop of 0.0 oz/in^2 was used and was based on information provided by Steffes Flare systems for the Air Assist Model 4. The flame arrestor pressure drop used was 1.1 oz/in^2 and is based on the Enardo sizing program for a 4" Series 8 inline flame arrestor.

The total gas flow rate to the flare used was 276 mscfd (883 lb/hr), and is based on a condensate flash factor and gas composition provided by Marathon Oil. The gas composition used was the average composition from the February 2017 Clarks Creek (MM) Analysis Summary. Credit was taken for the VRT thereby reducing the amount of flashed gas that was calculated using the provided flash gas factor.

Using the same calculation methodology, the total gas flow rate can be increased to 391 MSCFD (1251 lb/hr) and stay below the opening pressure of an Enardo ES-660 thief hatch (14.4 oz/in^2). This is approximately 1.41 times the normal operating flow.

Standard pressure drop "K" value for fittings and valves per Crane Technical Paper 410 were used. The value used for the absolute roughness of steel was 0.00015 ft.

**Attached are the tabulated results of the hydraulic calculations*

Disclaimer:

This assessment meets the certification requirements of 40 CFR part 60 subpart 0000a. It is the responsibility of *Marathon Oil* to comply with the reporting requirements of this regulation.

This evaluation does not consider the destructive efficiency of the controlled device or components upstream of the tank vent design.

HALKER
CONSULTING

7936 E. Arapahoe Ct., Suite 3200
Centennial, CO 80112
303-515-2700

VERONICA FACILITY TANK BATTERY VENT LINE DESIGN AND CAPACITY ASSESSMENT

TO:	Marathon Oil
FROM:	John Van Pelt
CC:	Tim Archuleta, Nate Mascarenas, Kendra Meeker
DATE:	June 12, 2017
RE:	Veronica Facility- Vent Line Design and Capacity Assessment

(b) (6) [redacted]

The US EPA finalized "Standards of Performance for Crude Oil and Natural Gas Facilities for which Construction, Modification or Reconstruction Commenced After September 18, 2015" on June 3, 2016. This regulation has requirements for certifying the design of closed vent systems. An assessment of the closed vent must be performed to determine it is of sufficient design and capacity to ensure that all emissions from storage vessels are routed to the control device or process and have it certified by a qualified professional engineer. This regulation is 40 CFR 40 Subpart OOOOa, referred to as the Quad Oa regulation.

Certification for 40 CFR 60.5411a(d):

"I certify that the closed vent system design and capacity assessment was prepared under my direction or supervision. I further certify that the closed vent system design and capacity assessment was conducted and this report was prepared pursuant to the requirements of subpart Quad Oa of 40 CFR part 60. Based on my professional knowledge and experience, and inquiry of personnel involved in the assessment, the certification submitted herein is true, accurate, and complete. I am aware that there are penalties for knowingly submitting false information."

Purpose:

Evaluate the new Veronica facility tank battery vent line design to ensure that the Enardo ES-660 thief hatches, which are set at 16 oz/in^2 will not open during normal operating flow rate scenarios. The normal flow path for the vapor from the storage tanks will be to one flare where the off gas will be combusted to meet Quad Oa regulations.

Results:

Based on the 3D model of the vent system and predicted vapor flow rates, Halker Consulting evaluated the pipe routing from the storage tanks to the flare and calculated the expected pressure drop in the system during the Marathon Oil specified maximum predicted vapor flow rates. The pressure at the outlet of the flare was set at local atmospheric pressure of approximately 13.46 psia. Pressure drop through the piping system from the furthest storage tank to the flare was calculated and found to have a backpressure on the tank battery of 0.72 psig (11.5 oz/in^2g).

During normal operating conditions the 11.5 oz/in^2g pressure should be the highest pressure that the tanks will see and is 72% of the of 16 oz/in^2g set pressure of the thief hatch.

Calculations:

A flare tip pressure drop of 0.0 oz/in² was used and was based on information provided by Steffes Flare systems for the Air Assist Model 4. The flame arrestor pressure drop used was 1.45 oz/in² and is based on the Enardo sizing program for a 4" Series 8 inline flame arrestor.

The total gas flow rate to the flare used was 328 mscfd (1049 lb/hr), and is based on a condensate flash factor and gas composition provided by Marathon Oil. The gas composition used was the average composition from the February 2017 Clarks Creek (MM) Analysis Summary. Credit was taken for the VRT thereby reducing the amount of flashed gas that was calculated using the provided flash gas factor.

Using the same calculation methodology, the total gas flow rate can be increased to 371 MSCFD (1187 lb/hr) and stay below the opening pressure of an Enardo ES-660 thief hatch (14.4 oz/in²). This is approximately 1.13 times the normal operating flow.

Standard pressure drop "K" value for fittings and valves per Crane Technical Paper 410 were used. The value used for the absolute roughness of steel was 0.00015 ft.

**Attached are the tabulated results of the hydraulic calculations*

Disclaimer:

This assessment meets the certification requirements of 40 CFR part 60 subpart 0000a. It is the responsibility of *Marathon Oil* to comply with the reporting requirements of this regulation.

This evaluation does not consider the destructive efficiency of the controlled device or components upstream of the tank vent design.